













**THE BULLETIN**  
OF THE  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE**  
**RALEIGH**

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**Vol. 36, No. 1.**

**JANUARY, 1915**

**Whole No. 205** /

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FARMERS' INSTITUTES  
JAN 20 1915

**ANNUAL REPORT**  
**OF**  
**FARMERS' INSTITUTES**

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**PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.**

**Entered at the Postoffice at Raleigh, N. C., as second class matter,**

**February 7, 1901, under Act of June 6, 1900.**

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**EDWARDS & BROUGHTON PRINTING CO.**  
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‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

## LETTER OF TRANSMITTAL

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RALEIGH, N. C., December 8, 1914.

HON. W. A. GRAHAM,

*Commissioner of Agriculture.*

Raleigh, N. C.

SIR:—Herewith find my annual report of Farmers' and Women's Institutes for the current year, which I recommend for the January, 1915, BULLETIN.

Respectfully,

T. B. PARKER,

*Directors of Farmers' Institutes.*

Approved for printing:

W. A. GRAHAM,

*Commissioner.*





# REPORT OF FARMERS' INSTITUTES, 1914

BY T. B. PARKER, DIRECTOR OF FARMERS' INSTITUTES.

From December 1, 1913, to November 30, 1914, the following number of institutes were held in the State under the auspices of the State Department of Agriculture: 250 regular institutes for men, 9 special or Orchard Demonstration Institutes, and 2 institutes for negroes, with a total attendance of 35,632. There were held at the same time and places 240 regular institutes for women with an attendance of 33,227, with an additional attendance of 2,960 at local institutes, making the total attendance at women's institutes 36,187, or a grand total for men and women of 71,819, against 57,805 for last year.

The demand for institutes was much greater this year than in any previous year.

## FARMERS' INSTITUTES, 1914.

County	Date	Place	Lecturers
Alamance.....	Aug. 17	Elon College.....	Hendricks, Curtis, Garren.
	Aug. 18	Maywood.....	Hendricks, Curtis, Garren.
	Aug. 19	Spring Graded School ...	Hendricks, Curtis, Garren.
	Aug. 20	Hawfield Graded School ..	Hendricks, Curtis, Garren.
Alexander.....	July 31	Taylorsville.....	Kerr, French, Young.
Alleghany.....	Sept. 14	Glade Valley.....	Sherman, Hudson, Reed.
	Sept. 15	Sparta.....	Sherman, Hudson, Reed.
	Sept. 16	Whitehead.....	Sherman, Hudson, Reed.
Anson.....	Aug. 8	McFarlan.....	Chrisman, Young, Parker, T. F.
	Aug. 11	Polkton.....	Chrisman, Young, Parker, T. F.
	Aug. 12	Wadesboro.....	Chrisman, Young, Parker, T. F.
	Aug. 20	Ansonville.....	Chrisman, Sloan, Kerr.
Ashe.....	Sept. 17	Scottville.....	Sherman, Hudson, Reed.
	Sept. 18	Grassy Creek.....	Sherman, Hudson, Reed.
	Sept. 19	Jefferson.....	Sherman, Hudson, Reed.
Avery.....	Sept. 22	Banners Elk.....	Sherman, Hudson, Reed.
Beaufort.....	Jan. 19	Bath.....	Sherman, Latham, Sloan.
	Jan. 20	Aurora.....	Sherman, Latham, Sloan.
	Jan. 21	Washington.....	Sherman, Latham, Sloan.
	Jan. 24	Pantego.....	Sherman, Latham, Sloan.
	Oct. 27-28	Bath.....	Latham, Sloan.
Bertie.....	Feb. 16	Mars Hill.....	Sherman, Rives.
	Feb. 17	Windsor.....	Sherman, Rives.
Bladen.....	Jan. 22	Tarheel.....	Garren, Hill, Robertson.
Brunswick.....	Feb. 3	Winnabow.....	Garren, Hill, Robertson.
	Feb. 4	Mt. Pisgah.....	Garren, Hill, Robertson.
	Feb. 6	Ash.....	Garren, Hill, Robertson.
	Sept. 1	Swannanoa.....	Garren, Hill.
Buncombe.....	Sept. 30	Sand Hill.....	Parker, T. B., Cheshire, Garren.
	Aug. 5	Hildebran.....	Kerr, French, Young.
Burke.....	Aug. 6	Hickory Grove S. H.....	Kerr, French, Young.
	Aug. 11	Rimer.....	Hendricks, Curtis, Owen.
Cabarrus.....	Aug. 12	Concord.....	Hendricks, Curtis, Owen, Sloan.
Caldwell.....	Aug. 3	Collettsville.....	Kerr, French, Young.
	Aug. 4	Hudson.....	Kerr, French, Young.

## FARMERS' INSTITUTES, 1914—Continued.

County	Date	Place	Lecturers
Camden	Jan. 31	Camden C. H.	Sherman, Burgess, Sloan.
Carteret	Feb. 10	Newport	Kerr, Newell, Sloan.
Caswell	July 29	Leasburg	Scott, Parker, T. B., Cunningham.
	July 30	Semora	Scott, Parker, T. B., Cunningham.
Catawba	Aug. 14	Cloninger's Farm	Robinson, Shuford, Combs.
	Aug. 15	Rockett, S. H.	Robinson, Shuford, Combs.
	Aug. 17	Catawba	Robinson, Shuford, Combs.
	Aug. 18	Terrells S. H.	Robinson, Shuford, Combs.
	Aug. 19	St. James S. H.	Robinson, Shuford, Combs.
	Aug. 20	Shuford's Farm	Robinson, Shuford, Combs.
	Aug. 21	Providence S. H.	Robinson, Shuford, Combs.
	Aug. 22	Killian S. H.	Robinson, Shuford, Combs.
	Aug. 29	Minerva S. H.	Robinson, Shuford, Combs.
Chatham	July 24	Siler City	Hendricks, Garren.
Cherokee	Sept. 15	Ranger	Parker, T. B., Cheshire, Perkins.
	Sept. 18	Murphy	Parker, T. B., Cheshire, Perkins.
	Sept. 19	Andrews	Parker, T. B., Cheshire, Perkins.
Chowan	Jan. 29	Edenton	Sherman, Burgess, Sloan.
Clay	Sept. 16	Brasstown	Parker, T. B., Cheshire, Perkins.
	Sept. 17	Hayesville	Parker, T. B., Cheshire, Perkins.
Cleveland	Aug. 11	Casar	Kerr, French, Combs.
	Aug. 12	Belwood	Kerr, French, Combs.
	Aug. 13	Shelby	Kerr, French, Combs.
	Aug. 15	Waco	Kerr, French, Combs.
Columbus	Feb. 7	Old Dock	Garren, Hill.
	Feb. 9	Whiteville	Garren, Shaw.
	Feb. 10	Chadbourn	Garren, Shaw.
	Feb. 11	Tabor	Garren, Shaw.
Craven	Feb. 6	Beech Grove	Kerr, Newell, Sloan.
	Feb. 7	Ernul	Kerr, Newell, Sloan.
Cumberland	Jan. 21	King Hiram S. H.	Garren, Hill, Robertson.
	Jan. 24	Stedman	Garren, Hill, Robertson.
Currituck	Feb. 2	Coinjock	Sherman, Rives.
	Feb. 3	Newbern's Landing	Sherman, Rives.
Davidson	July 24	Enterprise	French, Sloan.
	Aug. 1	Boston S. H.	Hendricks, Garren, Shook.
	Aug. 5	Cedar Springs S. H.	Hendricks, Garren, Shook.
	Aug. 6	Clarksburg	Parker, T. B., Holmes.
Davie	July 27	Farmington	Kerr, French, Sloan.
	July 28	Center Church	Kerr, French, Sloan.
Duplin	Jan. 30	Calypso	Kerr, Newell.
	Feb. 2	Concord	Kerr, Newell.
Durham	July 25	Mineral Springs	Scott, Parker, T. B.
	July 27	Lowe's Grove S. H.	Scott, Parker, T. B.
	Aug. 21	Bahama	Hendricks, Curtis, Garren.
Edgecombe	April —	Dixie S. H.	Burgess.
	Jan. 19	Battleboro	Kerr, Newell.
Forsyth	July 25	Clemmons	French, Sloan.
	Aug. 15	Belew's Creek	Scott, Eaton.
	Aug. 19	Burke's Grove	Scott, Garren.
	Aug. 20	Cold Springs	Scott, Garren.
Franklin	Feb. 25	Louisburg	Parker, T. B., Garren, Sloan.
Gaston	Aug. 17	Sunnyside S. H.	French, Parker, T. F., Combs.
	Aug. 18	Eakers S. H.	French, Parker, T. F., Combs.
	Aug. 21	Stanley	French, Parker, T. F., Combs.
Gates	Feb. 9	Eure	Sherman, Rives.
Granville	Feb. 27	Stovall	Garren, Sloan.
	Feb. 28	Creedmoor	Garren, Parker, T. B.
Guilford	July 29	Pleasant Garden	Hendricks, Shook, Garren.

## FARMERS' INSTITUTES, 1914—Continued.

County	Date	Place	Lecturers
Guilford	July 30	McLeansburg	Hendricks, Shook, Garren.
	July 31	Jamestown	Hendricks, Shook, Garren.
	Aug. 1	Battleground	Scott, Sloan.
Halifax	Aug. 21	Colfax	Scott, Garren.
	Jan. 21	Scotland Neck	Kerr, Newell.
	Feb. 23	Aurelian Springs	Garren, Parker, T. B.
Harnett	Feb. 17	Duke	Garren, Parker, Graham, Hill.
Haywood	Sept. 10	Bethel	Parker, Cheshire, Perkins.
	Sept. 11	Rock Springs	Parker, Cheshire, Perkins.
	Sept. 12	Waynesville	Parker, Cheshire, Perkins.
Henderson	Sept. 2	Liberty S. H.	Parker, Cheshire, Perkins.
	Sept. 5	Mills River	Parker, Cheshire, Perkins.
	Sept. 8	Dana	Parker, Cheshire, Perkins.
	Sept. 9	Fletcher	Parker, Cheshire, Perkins.
Hertford	Feb. 10	Winton	Sherman, Rives.
	Feb. 11	Murfreesboro	Sherman, Rives.
	Feb. 18	Ahoskie	Sherman, Rives.
Hoke	July 29	Raeford	Chrisman, Parker, T. F., Newman.
Hyde	Jan. 22	Swan Quarter	Sherman, Latham, Sloan.
	Jan. 23	Sladesville	Sherman, Latham, Sloan.
Iredell	July 29	Cool Springs	Kerr, French, Sloan.
	July 30	Eupeptic Springs	Kerr, French, Sloan.
	Aug. 1	Test Farm	Kerr, French, Young.
	Aug. 14	Mooreville	Hendricks, Curtis, Owen, Sloan.
Jackson	Sept. 26	Cullowhee	Parker, T. B., Cheshire, McCracken.
Johnston	Jan. 15	Pleasant Hill	Garren, Hill.
	Jan. 15	Micro	Sherman, McLean, Sloan.
	Jan. 16	Sandy Grove	Garren, Hill.
Jones	Feb. 5	Pollocksville	Kerr, Newell, Sloan.
Lee	Oct. 9	Broadway	Garren, Sloan.
	Oct. 10	Sanford	Garren, Sloan.
Lenoir	Jan. 24	LaGrange	Kerr, Newell.
	Feb. 11	Kinston	Kerr, Newell, Sloan.
Lincoln	Aug. 19	Reepsville	French, Parker, T. F., Combs.
	Aug. 20	Lineolnton	French, Parker, T. F., Combs.
Macon	Sept. 21	Franklin	Parker, T. B., Cheshire, McCracken.
	Sept. 22	Maxwell	Parker, T. B., Cheshire, McCracken.
	Sept. 23	Otto	Parker, T. B., Cheshire, McCracken.
	Sept. 24	West Hill S. H.	Parker, T. B., Cheshire, McCracken.
	Sept. 25	Hidgonville	Parker, T. B., Cheshire, McCracken.
Madison	Sept. 28	Marshall	Parker, T. B., Cheshire, McCracken.
	Sept. 29	Mars Hill	Parker, T. B., Cheshire, McCracken.
McDowell	Aug. 7	Marion	Kerr, French, Parker, Garren.
Martin	Jan. 22	Oak City	Kerr, Newell.
	Feb. 7	Williamston	Sherman, Rives.
	June 4	Parmele (colored)	Sloan.
Mecklenburg	Aug. 13	Huntersville	Hendricks, Curtis, Owen, Sloan.
	Aug. 17	Carolina Academy	Chrisman, Kerr, Sloan.
	Aug. 18	Mint Hill	Chrisman, Kerr, Sloan.
	Mar. 6	Biddle University	Garren, Sloan.
	Sept. 4	Biddle University	Sloan, Graeber.
Mitchell	Aug. 12	Bakersville	Parker, Garren, Holmes.
	Aug. 13	Spruce Pine	Parker, Garren, Holmes.
Montgomery	Aug. 1	Candor	Chrisman, Parker, T. F., Newman.
	Aug. 4	Star	Chrisman, Parker, T. F., Sloan.
	Aug. 5	Troy	Chrisman, Parker, T. F., Sloan.
	Aug. 6	Mt. Gilead	Chrisman, Parker, T. F., Sloan.
Moore	July 24	Bethlehem Church	Chrisman, Parker, T. F., Newman.
	July 25	Glendon	Chrisman, Parker, T. F., Newman.

## FARMERS' INSTITUTES, 1914—Continued.

County	Date	Place	Lecturers
Moore.....	July 27	Cameron.....	Chrisman, Parker, T. F., Newman.
	July 25	Aberdeen.....	Chrisman, Parker, T. F., Newman.
	July 30	West End.....	Chrisman, Parker, T. F., Newman.
	July 31	Big Oak.....	Chrisman, Parker, T. F., Newman.
Nash.....	Jan. 15	Stanhope.....	Kerr, Newell.
	Jan. 16	Nashville.....	Kerr, Newell.
New Hanover.....	Jan. 31	Wrightsboro.....	Garren, Hill.
Northampton.....	Feb. 12	Conway.....	Sherman, Rives.
	Feb. 13	Lasker.....	Sherman, Rives.
	Feb. 14	Rich Square.....	Sherman, Rives.
Onslow.....	Feb. 4	Harris Creek S. H.....	Kerr, Newell, Sloan.
	Feb. 12	Richlands.....	Kerr, Newell, Sloan.
Orange.....	Aug. 22	Hillsboro.....	Scott, Garren, Parker, T. B.
Pamlico.....	Feb. 9	Bayboro.....	Kerr, Newell, Sloan.
Pasquotank.....	Feb. 4	Elizabeth City.....	Sherman, Rives.
	Feb. 5	Salem.....	Sherman, Rives.
	Jan. 29	Atkinson.....	Garren, Hill, Eaton, Dr. Smith.
Pender.....	Feb. 2	Burgaw.....	Garren, Hill, Eaton, Dr. Smith.
	Feb. 3	Willard.....	Kerr, Newell, Sloan.
	Mar.		
	17-18	Watha.....	Parker, Garren, Sloan.
	Nov.		
	4-5	Watha.....	Hutt, Hudson, Sloan, Hargett, Mc-Vean.
Perquimans.....	Jan. 30	Hertford.....	Sherman, Burgess, Sloan.
Person.....	July 28	Chub Lake.....	Scott, Parker, T. B., Cuningham.
Pitt.....	Jan. 17	Grimesland.....	Sherman, McLean, Sloan.
	Jan. 23	Grifton.....	Kerr, Newell.
	Feb. 14	Greenville.....	Kerr, Newell, Sloan.
	Sept. 7	Columbus.....	Parker, T. B., Cheshire.
Polk.....	July 25	Pleasant Ridge.....	Hendricks, Garren.
	July 27	Liberty.....	Hendricks, Garren.
	July 28	Providence S. H.....	Hendricks, Garren, Shook.
	Aug. 3	Seagrove.....	Hendricks, Garren, Shook.
	Aug. 4	Farmer.....	Hendricks, Garren, Shook.
Richmond.....	Aug. 3	Ellerbe Springs.....	Chrisman, Parker, T. F., Sloan.
	Aug. 10	Rockingham.....	Chrisman, Parker, T. F., Young.
	Jan. 19	Antioch.....	Garren, Robertson, Shaw.
Robeson.....	Jan. 20	Lumber Bridge.....	Garren, Robertson, Shaw.
	Jan. 23	St. Pauls.....	Garren, Robertson, Hill.
	Feb. 12	Fairmont.....	Garren, Robertson, Shaw.
	Oct. 17	Back Swamp.....	Parker, T. B.
	July 31	Ruffin.....	Scott, Parker, T. B., Sloan.
Rockingham.....	Aug. 13	New Bethel Academy.....	Scott, Eaton.
	Aug. 14	Stoneville.....	Scott, Eaton.
	Aug. 8	Rockwell.....	Hendricks, Shook.
Rowan.....	Aug. 10	China Grove.....	Hendricks, Curtis, Owen.
	Aug. 15	Mt. Ulla.....	Hendricks, Curtis, Owen.
	Aug. 21	Liberty S. H.....	Chrisman, Kerr, Sloan.
	Aug. 22	Woodleaf.....	French, Combs, Parker, T. F.
	Aug. 8	Forest City.....	French, Combs, Kerr.
Rutherford.....	Aug. 10	Golden.....	Kerr, French, Combs.
	Aug. 14	Dobbin's S. H.....	Kerr, French, Combs.
	Jan. 17	Newton Grove.....	Garren, Hill.
Sampson.....	Jan. 26	Piney Green.....	Garren, Hill, Eaton.
	Jan. 27	Garland.....	Garren, Hill, Eaton.
	Jan. 28	Harrells Store.....	Garren, Hill, Eaton.
	Jan. 31	Beulah S. H.....	Kerr, Newell.
		Clinton (colored).....	Parker, T. B.



## FARMERS' INSTITUTES, 1914—Continued.

County	Date	Location	Lecturers
Stanly.....	Aug. 6	Endy, S. H.....	Hendricks, Shook.
	Aug. 7	Richfield.....	Hendricks, Shook.
	Aug. 7	Norwood.....	Chrisman, Parker, T. F., Sloan.
Stokes.....	Aug. 11	Walnut Cove.....	Scott, Eaton, Sloan.
	Aug. 12	Danbury.....	Scott, Eaton.
Surry.....	Aug. 17	Piney Grove Church.....	Scott, Garren.
	Aug. 18	Pilot Mountain.....	Scott, Garren.
Swain.....	Sept. 14	Bryson City.....	Parker, T. B., Cheshire, Perkins.
Transylvania.....	S-pt. 3	Selica.....	Garren.
	Sept. 4	Blantyre.....	Garren, Dr. Owen.
Tyrrell.....	Jan. 27	Columbia.....	Sherman, Burgess, Sloan.
Union.....	Aug. 13	Marshville.....	Chrisman, Parker, T. F., Young.
	Aug. 14	Marvin.....	Chrisman, Parker, T. F., Young.
	Aug. 15	Waxhaw.....	Chrisman, Parker, Sloan.
	Aug. 19	Indian Trail.....	Chrisman, Kerr, Sloan.
Washington.....	Jan. 28	Creswell.....	Sherman, Burgess, Sloan.
	Feb. 6	Plymouth.....	Sherman, Rives.
Watauga.....	Sept. 21	Valle Crucis.....	Sherman, Hudson, Reed.
	Sept. 23	Boone.....	Sherman, Hudson, Reed.
Wayne.....	Jan. 26	Seven Springs.....	Kerr, Newell.
	Jan. 27	Memorial Church.....	Kerr, Newell.
	Jan. 28	Falling Creek.....	Kerr, Newell.
	Jan. 29	Smith's Chapel.....	Kerr, Newell.
Wilkes.....		Dudley (colored).....	Parker, T. B.
	Aug. 3	Millers Creek.....	Scott.
	Aug. 4	Beaver Creek.....	Scott, Robinson.
	Aug. 5	Boomer.....	Scott, Robinson.
	Aug. 6	Newhope Church.....	Scott, Robinson.
	Aug. 7	Clingman S. H.....	Scott, Robinson.
Wilson.....	Sept. 11	Trap Hill.....	Sherman, Hudson, Reed.
	Jan. 16	Stantonsburg.....	Sherman, McLean, Sloan.
	Jan. 17	Rock Ridge.....	Kerr, Newell.
Yadkin.....	Aug. 8	Hamptonville.....	Scott, Sloan.
	Aug. 10	Booneville.....	Scott, Sloan.
Yancey.....	Aug. 8	Burnsville.....	Parker, T. B., Garren, Holmes.
	Aug. 10	Bald Creek.....	Parker, T. B., Garren, Holmes.
	Aug. 11	Daybook.....	Parker, T. B., Garren, Holmes.

## LECTURERS AND SUBJECTS.

Name	No. Institutes Attended.	Subjects
BROWNE, T. E.....	5	Peanut Culture.
District Demonstration Agent.		Corn Culture.
BURGESS, J. L.....	9	Farm Crops.
Agronomist, Department of Agriculture.		Soil Building.
CHESHIRE, J. W.....	35	The Value of Birds.
Secretary North Carolina Audubon Soc.		
CHRISMAN, W. G.....	25	Diseases of Live Stock.
Veterinarian V. P. I.		Growing Live Stock.
COMBS, STANLEY.....	12	Dairy Farming.
Assistant in Dairy Farming, N. C.		
CUNNINGHAM, J. S.....	5	Tobacco Culture.
Special Agent in Tobacco Investigation.		

## LECTURERS AND SUBJECTS—Continued

Name	No. Institutes Attended.	Subjects
CURTIS, R. S. Assistant in Animal Husbandry.	14	Beef Production.
EATON, W. H. Dairy Expert.	21	Silo and Silage. Care and Feeding of Dairy Cows. Butter Making.
FRENCH, A. L. Farmer.	26	Soil Improvement with Live Stock.
GARREN, G. M. Assistant Agronomist, Department of Agriculture.	64	Soil Improvement. Corn Culture. Legumes.
HARGETT, E. G. Assistant Veterinarian, Department of Agriculture.	1	Preventing Diseases.
HENDRICKS, M. J. Farmer.	25	Wheat Culture. Corn Culture.
HILL, R. G. Assistant Horticulturist.	24	Apple Culture. Vegetable Gardens.
Holmes, J. S. State Forester.	20	Forest Protection.
HUDSON, C. R. Farm Demonstration Work.	2	Soil Building. Corn Culture.
HUTT, W. N. State Horticulturist.	2	Pecan Growing. Orchard Management.
JOHNSON, J. M. Expert in Farm Management, U. S. Department of Agriculture.	2	Farm Management.
KERR, J. P. Farmer.	52	Poultry. Harvesting Corn.
LATHAM, J. F. Farmer.	7	Crop Rotation.
MCCRACKEN, R. P. Farmer.		Renovation of Wornout Land. Beef Production. Drainage.
McLEAN, T. D. District Demonstration Agent.	5	Cotton Growing. Soil Improvement.
McVEAN, J. D. Pig Clubs.	1	Swine Management.
MILLSAPS, E. S. District Demonstration Agent.	5	Corn Culture. Cotton Culture. Cooperation.
NEWELL, F. B. Farmer, Demonstration Agent.	27	Cover Crops.
NEWMAN, C. L. Professor of Agriculture, Agricultural and Mechanical College.	8	Soil Improvement. Cotton Culture. Commercial Fertilizers
OWEN, F. D. U. S. Department of Agriculture.	18	Hog Cholera and its Prevention.
PARKER, T. B. Director of Farmers' Institutes, Department of Agriculture.	40	Commercial Fertilizers. Corn and Cotton Culture. Soil Building.
PARKER, T. F. Professor of Agriculture, Porto Rico.	25	Mixing Fertilizers. Cotton Culture.
PERKINS, E. L. Farmer, Demonstration Agent.	14	Cover Crops. Soil Improvement.

## LECTURERS AND SUBJECTS—Continued.

Name	No. Institutes Attended.	Subjects
REED, A. J. .... Dairy Specialist, U. S. Department of Agriculture.	14	Dairying.
RIVES, J. R. .... Farmer.	14	Cooperation.
ROBERTSON, A. K. .... Assistant in Boys' Corn Clubs.	12	Corn Growing.
ROBINSON, JOHN W. .... Farmer.	10	Dairying. Cooperation.
SHAW, S. B. .... Assistant Horticulturist, Department of Agriculture.	6	Apple Culture. Spraying and Spray Materials.
SHERMAN, FRANKLIN, JR. .... State Entomologist, Department of Agriculture.	38	Insect Pests and Their Control.
SCOTT, R. W. .... Farmer.	25	Diversified Farming.
SHOOK, L. W. .... Assistant Swine Investigations.	14	Live Stock.
SHUFORD, W. J. ....	8	Cooperation.
SLOAN, R. L. .... Assistant Director Farmers' Institutes, Department of Agriculture.	60	Crop Rotation. Soil Fertility.
WILLIAMS, C. B. .... Assistant Director Experiment Station, Department of Agriculture.		Farm Crops. Lime and its Use.
YOUNG, H. C. .... Instructor A. & M. College.	14	Plant Diseases.

## County and Local Farmers' Institute Organizations.

Farmers' Institute Committees are appointed in all the counties where institutes are held. The duties of the members of the committees are to suggest places where the institutes are to be held, topics for discussion, advertise the meetings, look after the comfort of those attending the meetings, see that the house or hall in which the institute is to be held is put in good order before the hour for the institute to meet.

Farmers' clubs, local Farmers' Alliances, and local Farmers' Unions can greatly help the institutes by cooperating with the local institute committees and the conductor of the institute party. Such cooperation is welcomed.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES.

County	Chairman of Committee	Postoffice
Alamance.....	C. R. Cates.....	Mebane.
Elon College.....	W. P. Lawrence.....	Elon College.
Spring Graded School.....	Prof. E. P. Dixon.....	Saxapahaw.
Alexander.....	J. H. Smith.....	Taylorsville.
Alleghany.....	S. F. Thompson.....	Walls.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES—Continued

County	Chairman of Committee	Postoffice
Anson:		
McFarlan.....	W. J. McLendon.....	Morven.
Polkton.....	J. W. Kiker.....	Polkton.
Wadesboro.....	T. H. Knotts.....	Wadesboro.
Ansonville.....	S. M. Clark.....	Ansonville.
Ashe.....	John Dent.....	Jefferson.
Scottsville.....	Ed. Shepherd.....	Scottsville.
Beaufort.....	W. D. Grimes.....	Washington.
Bath.....	J. B. Archbell.....	Bath.
Bertie.....	C. W. Spruill.....	Quitsna.
Mars Hill.....	Josiah Brown.....	Coleraine.
Bladen.....	R. B. Cromartie.....	Elizabethtown.
Council.....	T. A. Jones.....	Zara.
Tarheel.....	S. P. Metcalf.....	Tarheel.
Clarkton.....	W. J. Cox.....	Clarkton.
Abbottsburg.....	F. S. Averitt.....	Abbottsburg.
Brunswick.....	Jack Johnson.....	Winnabow.
Ash.....	R. M. Long.....	Ash.
Shallotte.....	E. M. Parker.....	Shallotte.
Supply.....	O. B. Sellers.....	Supply.
Cool Run School House.....	J. M. Hewett.....	Shallotte.
Buncombe:		
Democrat.....	S. H. Carter.....	Democrat.
Swannanoa.....	F. S. Puckett.....	Swannanoa.
Burke.....	J. M. Coulter.....	Connelly Springs.
Hickory Grove.....	J. A. Lackey.....	Morganton.
Cabarrus.....	R. D. Goodman.....	Concord.
Rimer.....	M. W. Allman.....	Concord, No. 4.
Harrisburg.....	C. L. Sims.....	Harrisburg.
Mt. Pleasant.....	W. H. Fisher.....	Mt. Pleasant.
Caldwell.....	G. M. Goforth.....	Lenoir.
Collettsville.....	C. H. Holloway.....	Collettsville.
Hudson.....	C. E. Conley.....	Lenoir, No. 3.
Camden.....	W. G. Ferebee.....	Gregory.
Carteret.....	D. N. McCain.....	Newport.
Caswell.....	J. F. Walters.....	Blanche.
Leasburg.....	W. S. Dixon.....	Leasburg.
Chatham:		
Bynum.....	R. L. Ward.....	Riggsbee.
Farrington.....	J. E. Womble.....	Apex, No. 4.
Goldston.....	I. P. Coggins.....	Bear Creek.
Siler City.....	J. R. Paschal.....	Siler City.
Cherokee.....	G. B. Walker.....	Andrews.
Murphy.....	B. M. Ledford.....	Ranger.
Andrews.....	D. W. Whisenhunt.....	Andrews.
Chowan.....	Z. W. Evans.....	Tyner.
Clay.....	W. T. Bumgarner.....	Hayesville.
Brasstown.....	Carl Scroggs.....	Brasstown.
Ogden.....	G. S. McClure.....	Ogden.
Elf.....	W. A. Cassada.....	Hayesville, No. 1.
Cleveland.....	J. T. Gardner.....	Shelby.
Casar.....	A. A. Warlick.....	Casar.
Belwood.....	J. B. Short.....	Belwood.
Waco.....	C. C. Beam.....	Waco.
Columbus.....	D. Boughner.....	Chadbourn.
Tabor.....	Minos Meares.....	Tabor.
Whiteville.....	Dr. W. Ross Davis.....	Whiteville.
Old Doek.....	C. W. Suggs.....	Old Doek.
Hallsboro.....	J. A. Wyche.....	Hallsboro.



## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES—Continued.

County	Chairman of Committee	Postoffice
Craven.....	W. H. Bray.....	New Bern.
Vanceboro.....	O. McLawhorne.....	Vanceboro.
Beach Grove.....	G. T. Richardson.....	New Bern.
Ernul.....	D. P. Whitford.....	Askin.
Cumberland.....	W. H. Downing.....	Fayetteville.
Stedman.....	R. S. Autry.....	Stedman.
King Hiram.....	J. H. Smith.....	Hope Mills.
Currituck.....	J. J. Ferebee.....	Shawboro.
Davidson:		
Boston S. H.....	D. S. Hayworth.....	High Point.
Cedar Springs.....	J. R. Crouse.....	Cid.
Enterprise.....	Luther Nifong.....	Winston-Salem, No. 4.
Davie.....	W. R. Clement.....	Mocksville.
Farmington.....	A. W. Ellis.....	Farmington.
Center Church.....	E. B. Barneycastle.....	Mocksville.
Mock, S. H.....	B. S. Orrell.....	Advance.
Duplin.....	J. A. Shine.....	Faison.
Calypso.....	J. T. Albritton.....	Mt. Olive.
Rose Hill.....	Maury Ward.....	Rose Hill.
Faison.....	H. J. Faison.....	Faison.
Durham.....	J. M. Gray.....	Durham.
Mineral Springs.....	A. C. Weatherly.....	Gorman.
Lowe's Grove.....	J. C. High.....	Durham.
Edgecombe.....	G. T. DeBerry.....	Tarboro.
Conetoe.....	N. B. Dawson.....	Conetoe.
Whitakers.....	M. J. Battle.....	Whitakers.
Speed.....	B. F. Shelton.....	Speed.
Forsyth.....	A. B. Atwood.....	Winston-Salem.
Belew's Creek.....	J. E. Sapp.....	Belew's Creek.
Burke Grove.....	P. E. Burke.....	Winston-Salem, No. 1.
Cold Spring.....	C. E. Ebert.....	Winston-Salem.
Clemmons.....	T. W. Griffith.....	Clemmons.
Franklin.....	T. B. Wilder.....	Louisburg.
Franklinton.....	J. C. Winston.....	Franklinton.
Gaston.....	E. D. Thompson.....	Stanley.
Sunnyside S. H.....	H. S. Sellers.....	Kings Mountain.
Chapel Church.....	E. A. Hurley.....	Gastonia.
Gates.....	W. J. Boone.....	Drum Hill.
Eure.....	T. E. Story.....	Eure.
Granville.....	E. G. Moss.....	Creedmoor.
Stovall.....	C. L. Lewis.....	Stovall.
Creedmoor.....	C. H. Cozart.....	Creedmoor.
Greene.....	W. R. Dixon.....	Snow Hill.
Grimsley's Church.....	J. T. Dixon.....	Farmville.
Guilford:		
Pleasant Garden.....	C. E. Hockart.....	Pleasant Garden.
McLeansburg.....	Junius Boone.....	McLeansburg.
Jamestown.....	W. L. Kivett.....	High Point.
Battleground.....	J. C. Frazier.....	Guilford College.
Colfax.....	W. L. Gibbons.....	Colfax.
Halifax.....	J. H. Sherrod.....	Enfield.
Scotland Neck.....	G. W. Bryan.....	Scotland Neck.
Littleton.....	Claude Sessoms.....	Littleton.
Aurelian Springs.....	J. R. Patterson.....	Littleton.
Harnett.....	C. McArtan.....	Lillington.
Coats.....	T. D. Stewart.....	Coats.
Duke.....	A. F. Fowler.....	Duke.
Haywood.....	Dr. G. D. Green.....	Waynesville.
Bethel.....	M. D. Kinsland.....	Waynesville.
Rock Hill.....	J. H. Allison.....	Dellwood.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES—Continued.

County	Chairman of Committee	Postoffice
Haywood:		
Canton.....	E. F. G. Murry.....	Canton.
Henderson.....	J. P. Fletcher.....	Fletcher.
Green River S. H.....	J. W. Ward.....	Zirconia.
Dana.....	Sam. L. Rau.....	Hendersonville.
Liberty.....	R. A. McKillop.....	Hendersonville.
Hertford.....	A. I. Parker.....	Winton.
Ahoskie.....	A. E. Garrett.....	Ahoskie.
Murfreesboro.....	J. J. Parker.....	Murfreesboro.
Hoke.....	W. M. McLean.....	Rae ford.
Hyde.....	Chas. Brinn.....	Swan Quarter.
Middletown.....	J. S. Mann.....	Middletown.
Iredell.....	J. W. Sherrill.....	Statesville, No. 6.
Mooreville.....	T. J. Williams.....	Mooreville.
Cool Springs.....	J. L. Abernathy.....	Elmwood.
Eupeptic Springs.....	J. K. Patterson.....	Statesville.
Jackson:		
Quallatown.....	J. E. Rogers.....	Whittier.
Cullowhee.....	F. H. Brown.....	Cullowhee.
Johnston.....	W. M. Sanders.....	Smithfield.
Kenly.....	L. B. Boyette.....	Kenly.
Benson.....	J. F. Lee.....	Benson.
Jones.....	T. C. Whitaker.....	Trenton.
Pollockville.....	A. H. White.....	Pollockville.
Lenoir.....	G. F. Lottin.....	Kinston.
LaGrange.....	J. E. Jones.....	LaGrange.
Lee.....	J. R. Rives.....	Santord.
Lincoln.....	T. J. Ramseur.....	Lincolnton.
McDowell.....	E. S. Frisbie.....	Marion.
Macon.....	Arthur Siler.....	Franklin.
Maxwell S. H.....	C. B. Yeargan.....	Franklin.
Otto.....	D. P. Cabe.....	Otto.
Higdonville.....	Parker Moore.....	Ellijay.
West's Mill.....	J. W. Murry.....	West's Mill.
Madison.....	L. M. Bryan.....	Marshall.
Mars Hill.....	A. F. Sprinkle.....	Mars Hill.
Martin.....	S. E. Hardison.....	Williamston.
Oak City.....	N. M. Worsley.....	Oak City.
Mecklenburg.....	C. C. Moore.....	Charlotte.
Huntersville.....	A. B. McAuley.....	Huntersville.
Carolina Academy.....	R. M. Bryant.....	Matthews, No. 17.
Bains Academy.....	D. A. Henderson.....	Matthews, No. 19.
Mitchell.....	Jos. Bowditch.....	Toecane.
Spruce Pine.....	N. S. Lawrence.....	Spruce Pine.
Montgomery.....	Clyde Caple.....	Troy.
Candor.....	D. C. Ewing.....	Candor.
Star.....	G. N. Scarboro.....	Star.
Mt. Gilead.....	R. A. Bruton.....	Mt. Gilead.
Moore.....	T. D. McLean.....	Carthage.
Bethlehem Church.....	J. A. Fry.....	Carthage.
Glendon.....	A. J. Jones.....	Glendon.
Cameron.....	N. P. McPherson.....	Cameron.
Aberdeen.....	D. J. Campbell.....	Aberdeen.
West End.....	W. P. Coreoran.....	West End.
Big Oak.....	D. C. McKinnie.....	Bisco.
Nash.....	S. F. Austin.....	Nashville.
Stanhope H. S.....	S. H. Brantley.....	Springhope.
New Hanover.....	Wm. Gregerson.....	Castle Hayne.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES—Continued.

County	Chairman of Committee	Postoffice
Northampton.....	J. W. Jessup.....	Rich Square.
Rich Square.....	W. E. Spivey.....	Rich Square.
Lasker.....	C. S. Lasker.....	Lasker.
Conway.....	J. O. Flythe.....	Conway.
Onslow.....	J. L. Nicholson.....	Richlands.
Richlands.....	J. M. Francke.....	Richlands.
Harris Creek.....	H. H. Shepherd.....	Cyrus.
Orange.....	A. H. Rimmer.....	Hillsboro.
Pamlico.....	G. T. Farnell.....	Bayboro.
Pasquotank.....	R. N. Morgan.....	Elizabeth City.
Weeksville.....	H. M. Pritchard.....	Weeksville.
Pender.....	W. M. Hand.....	Burgaw.
Atkinson.....	Geo. J. Moore.....	Atkinson.
Willard.....	J. H. Jeffries.....	Willard.
Perquimans.....	J. O. White.....	Hertford.
Person.....	J. W. Younger.....	Roxboro.
Pitt.....	J. F. Evans.....	Greenville.
Grifton.....	J. P. Quinerly.....	Grifton.
Grimesland.....	H. J. Smith.....	Grimesland.
Polk.....	T. T. Ballinger.....	Tryon.
Randolph:		
Pleasant Ridge.....	J. O. Forester.....	Ramseur.
Liberty.....	J. M. Williams.....	Liberty.
Providence S. H.....	S. W. White.....	Climax.
Seagrove.....	O. D. Lawrence.....	Seagrove.
Farmer.....	L. M. Kearns.....	Farmer.
Richmond.....	W. C. Leak.....	Rockingham.
Ellerbe.....	E. L. Pegram.....	Ellerbe.
Robeson.....	J. A. McAllister.....	Lumberton.
Parkton.....	W. S. Cobb.....	Parkton.
St. Paul.....	G. M. D. Howard.....	St. Paul.
Lumber Bridge.....	Neil Shaw.....	Lumber Bridge.
Fairmont.....	N. T. Andrews.....	Fairmont.
Red Springs.....	J. D. McLean.....	Red Springs.
Rockingham.....	J. V. Price.....	Madison.
Ruffin.....	John L. Williams.....	Pelham.
New Bethel.....	J. S. McCollum.....	Madison.
Rowan:		
Rockwell.....	C. H. Fisher.....	Rockwell.
China Grove.....	M. A. Stirewalt.....	China Grove.
Mt. Ulla.....	J. K. Goodman.....	Mt. Ulla.
Liberty S. H.....	P. N. Trexler.....	Gold Hill.
Rutherford.....	J. M. Jones.....	Rutherfordton.
Forest City.....	G. T. Moore.....	Forest City.
Ellenboro.....	G. S. Harrill.....	Ellenboro.
Sampson.....	S. H. Hobbs.....	Clinton.
Newton Grove.....	J. W. Bryan.....	Newton Grove.
Roseboro.....	D. W. Culbreth.....	Roseboro.
Garland.....	J. D. Johnson.....	Garland.
Spring Branch.....	W. A. Jackson.....	Cooper.
Scotland.....	W. N. McKenzie.....	Gibson.
Stanly.....	S. J. Lynch.....	Shankle.
Endy S. H.....	W. A. Harward.....	Bridgeport.
Richfield.....	E. D. Coggins.....	New London.
Stokes.....	I. G. Ross.....	Walnut Cove.
Walnut Cove.....	Chap. Bodenheimer.....	Germanton.
Surry:		
Piney Grove.....	J. L. Jackson.....	Mt. Airy.
Pilot Mountain.....	D. J. Denney.....	Pinnacle.
Swain.....	R. L. Sandidge.....	Bryson City.

## CHAIRMEN OF COUNTY AND LOCAL FARMERS' INSTITUTE COMMITTEES—Continued.

County	Chairman of Committee	Postoffice
Transylvania.....	W. H. Grogan.....	Brevard.
Selica.....	C. C. Duckworth.....	Selica.
Tyrrell.....	W. W. Sawyer.....	Columbia.
Union:		
Marshville.....	F. A. Marsh.....	Marshville.
Marvin.....	G. W. Sutton.....	Waxhaw.
Waxhaw.....	J. R. Eason.....	Waxhaw.
Indian Trail.....	J. W. Rollings.....	Indian Trail.
Vance.....	J. B. Allen.....	Henderson.
Middleburg.....	J. K. Plummer.....	Middleburg.
Wake.....	W. H. Chamblee, Jr. ....	Zebulon.
Warren.....	H. T. Macon.....	Warrenton.
Wise.....	P. R. Perkinson.....	Wise.
Washington.....	T. W. Blount.....	Roper.
Creswell.....	W. T. Hopkins.....	Creswell.
Wayne.....	J. M. Mitchell.....	Goldsboro.
Smith Chapel.....	W. B. Hood.....	Mt. Olive.
Pikeville.....	E. T. Crawford.....	Pikeville.
Hood Swamp.....	J. F. Smith.....	Aaron.
Falling Creek.....	G. M. Warrick.....	Goldsboro, No. 4.
Memorial Church.....	C. D. Hooks.....	Fremont.
Seven Springs.....	G. G. Quinn.....	Seven Springs.
Wilkes.....	A. G. Hendren.....	Straw.
Millers Creek.....	J. M. Gaither.....	Wilkesboro.
Beaver Creek.....	T. J. James.....	North Wilkesboro.
Boomer.....	M. S. Gibbs.....	Boomer.
New Hope Church.....	J. J. Hendren.....	Gilreath.
Clingman S. H.....	T. F. Callaway.....	Ronda.
Wilson.....	E. B. Dean.....	Wilson.
Yadkin.....	A. S. Speer.....	Boonville.
Hamptonville.....	D. D. Angell.....	Hamptonville.
Yancey.....	E. F. Watson.....	Burnsville.

## STATE FARMERS' CONVENTION.

B. F. Shelton.....	President.....	Speed, N. C.
W. S. Pharr.....	Vice-President.....	Charlotte, N. C.
J. B. Sellars.....	Vice-President.....	Maxton, N. C.
D. P. Whitford.....	Vice-President.....	Askin, N. C.
T. E. Browne.....	Secretary.....	Raleigh, N. C.

## WOMEN'S INSTITUTES, 1914.

County	Date	Place	Lecturers
Alamance.....	Aug. 17	Elon College.....	Miss Webb, Mrs. Robinson.
	Aug. 18	Maywood.....	Miss Webb, Mrs. Robinson.
	Aug. 19	Spring Graded School ....	Miss Webb, Mrs. Robinson.
	Aug. 20	Hawfields Graded School.	Miss Webb, Mrs. Robinson.
	Oct. 23	Springhope.....	Miss Hudgins.
Alexander.....	July 31	Taylorsville.....	Mrs. Hollowell, Miss Parris.
Alleghany.....	Sept. 14	Glade Valley.....	Miss Ward, Miss Cassidey.
	Sept. 15	Sparta.....	Miss Ward, Miss Cassidey.
	Sept. 16	Whitehead.....	Miss Ward, Miss Cassidey.
Anson.....	Aug. 8	McFarlan.....	Mrs. Hutt, Miss Clement.
	Aug. 11	Polkton.....	Mrs. Hutt, Miss Clement.

## WOMEN'S INSTITUTES, 1914—Continued.

County	Date	Place	Lecturers
Anson.....	Aug. 12	Wadesboro.....	Mrs. Hutt, Miss Clement.
	Aug. 20	Ansonville.....	Mrs. Hutt, Miss Clement.
		Mrs. Redfern's S. H.....	Mrs. Hutt.
		McFarlan.....	Mrs. Hutt.
		Dr. McLendon's.....	Mrs. Hutt.
		Morven.....	Mrs. Hutt.
		Polkton.....	Mrs. Hutt.
		Ansonville.....	Mrs. Hutt.
Ashe.....		Wadesboro.....	Mrs. Hutt.
	Sept. 17	Scottville.....	Miss Ward, Miss Cassidey.
	Sept. 18	Grassy Creek.....	Miss Ward, Miss Cassidey.
	Sept. 19	Jefferson.....	Miss Ward, Miss Cassidey.
Avery.....	Sept. 22	Banners Elk.....	Miss Ward, Miss Cassidey.
Beaufort.....	Oct. 28	Bath.....	Miss Hudgins.
	Jan. 19	Bath.....	Miss Ward, Miss Carroll.
	Jan. 20	Aurora.....	Miss Ward, Miss Carroll.
	Jan. 21	Washington.....	Miss Ward, Miss Carroll.
	Jan. 24	Pantego.....	Miss Ward, Miss Carroll.
Bertie.....	Feb. 16	Mars Hill.....	Miss Ward, Mrs. Maddry.
	Feb. 17	Windsor.....	Miss Ward, Mrs. Maddry.
Bladen.....	Jan. 22	Tarheel.....	Miss Webb, Mrs. Hollowell.
Brunswick.....	Feb. 3	Winnabow.....	Miss Webb, Mrs. Hollowell.
	Feb. 4	Mt. Pisgah.....	Miss Webb, Mrs. Hollowell.
	Feb. 5	Thomas S. H.....	Miss Webb, Mrs. Hollowell.
	Feb. 6	Ash.....	Miss Webb, Mrs. Hollowell.
Buncombe.....	Sept. 1	Swannanoa.....	Miss Hudgins, Mrs. Slagle.
	Sept. 30	Sand Hill.....	Miss Hudgins.
Burke.....	Aug. 5	Hildebran.....	Mrs. Hollowell, Miss Parris.
	Aug. 6	Hickory Grove.....	Mrs. Hollowell, Miss Parris.
Cabarrus.....	Aug. 11	Rimer.....	Miss Webb, Mrs. Robinson.
	Aug. 12	Concord.....	Miss Webb, Mrs. Robinson.
Caldwell.....	Aug. 3	Collettsville.....	Mrs. Hollowell, Miss Parris.
	Aug. 4	Hudson.....	Mrs. Hollowell, Miss Parris.
Camden.....	Jan. 31	Camden C. H.....	Miss Ward, Miss Carroll.
Carteret.....	Feb. 10	Newport.....	Miss Hudgins, Miss Mahler.
Caswell.....	July 29	Leasburg.....	Miss Hudgins, Miss Mahler.
	July 30	Semora.....	Miss Hudgins, Miss Mahler.
Catawba.....	Aug. 14	Cloninger's Farm.....	Mrs. Yoder, Miss Setzer.
	Aug. 15	Rockett S. H.....	Mrs. Yoder, Miss Setzer.
	Aug. 17	Catawba.....	Mrs. Nifong, Miss Yoder.
	Aug. 18	Terrell's Store.....	Mrs. Nifong, Miss Yoder.
	Aug. 19	St. James S. H.....	Mrs. Nifong, Miss Yoder.
	Aug. 20	Shuford's Farm.....	Mrs. Nifong, Miss Setzer, Miss Yoder.
	Aug. 21	Providence S. H.....	Mrs. Nifong, Miss Yoder.
	Aug. 22	Killian S. H.....	Miss Setzer, Mrs. Robinson.
	Aug. 29	Minerva S. H.....	Mrs. Robinson.
Chatham.....	July 24	Siler City.....	Miss Webb, Mrs. Robinson.
Cherokee.....	Sept. 15	Ranger.....	Miss Hudgins, Mrs. Slagle.
	Sept. 18	Murphy.....	Miss Hudgins, Mrs. Slagle.
	Sept. 19	Andrews.....	Miss Hudgins, Mrs. Slagle.
Chowan.....	Jan. 29	Edenton.....	Miss Ward, Miss Carroll.
Clay.....	Sept. 16	Brasstown.....	Miss Hudgins, Mrs. Slagle.
	Sept. 17	Hayesville.....	Miss Hudgins, Mrs. Slagle.
	Aug. 11	Casar.....	Mrs. Hollowell, Miss Arey.
Cleveland.....	Aug. 12	Belwood.....	Mrs. Hollowell, Miss Arey.
	Aug. 13	Shelby.....	Mrs. Hollowell, Miss Arey.
	Aug. 15	Waco.....	Mrs. Hollowell, Miss Arey.
Columbus.....	Feb. 7	Old Dock.....	Mrs. Hollowell, Miss Webb.
	Feb. 9	Whiteville.....	Mrs. Hollowell, Miss Webb.

## WOMEN'S INSTITUTES, 1914—Continued.

County	Date	Place	Lecturers
Columbus	Feb. 10	Chadbourn	Mrs. Hollowell, Miss Webb.
	Feb. 11	Tabor	Mrs. Hollowell, Miss Webb.
Craven	Feb. 6	Beech Grove	Miss Hudgins, Miss Mahler.
	Feb. 7	Ernul	Miss Hudgins, Miss Mahler.
Cumberland	Jan. 21	King Hiram S. H.	Mrs. Hollowell, Miss Mahler.
	Jan. 24	Stedman	Mrs. Hollowell, Miss Mahler.
Currituck	Feb. 2	Coinjock	Miss Ward, Mrs. Maddry.
	Feb. 3	Newbern's Landing	Miss Ward, Mrs. Maddry.
Davidson	July 24	Enterprise	Mrs. Hollowell, Miss Parris.
	Aug. 1	Boston S. H.	Miss Webb, Mrs. Robinson.
	Aug. 5	Cedar Springs	Miss Webb, Mrs. Robinson.
	Aug. 6	Clarksburg	Miss Parker, Miss Arey.
Davie	July 27	Farmington	Mrs. Hollowell, Miss Parris.
	July 28	Center Church	Mrs. Hollowell, Mrs. Parris.
Duplin	Jan. 30	Calypso	Miss Hudgins, Miss Mahler.
	Feb. 2	Concord	Miss Hudgins, Miss Mahler.
Durham	July 25	Mineral Springs	Miss Hudgins, Miss Mahler.
	July 27	Lowe's Grove	Miss Hudgins, Miss Mahler.
	Aug. 21	Bahama	Miss Webb, Mrs. Robinson.
Edgecombe	Jan. 19	Battleboro.	Miss Hudgins, Miss Mahler.
		Dixie S. H.	Miss Hudgins.
Forsyth	July 25	Clemmons	Mrs. Hollowell, Miss Parris.
	Aug. 15	Belew's Creek	Miss Hudgins, Miss Mahler.
	Aug. 19	Burke's Grove	Miss Hudgins, Miss Mahler.
	Aug. 20	Cold Springs	Miss Hudgins, Miss Mahler.
Franklin	Feb. 25	Louisburg	Miss Hudgins.
Gaston	Aug. 17	Sunnyside S. H.	Mrs. Hollowell, Miss Arey.
	Aug. 18	Eakers S. H.	Mrs. Hollowell, Miss Arey.
	Aug. 21	Stanley	Mrs. Hollowell, Miss Arey.
Gates	Feb. 9	Eure	Miss Ward, Mrs. Maddry.
Granville	Feb. 27	Stovall	Miss Hudgins.
	Feb. 28	Creedmoor	Miss Hudgins.
	July 29	Pleasant Garden	Miss Webb, Mrs. Robinson.
Guilford	July 30	McLeansburg	Miss Webb, Mrs. Robinson.
	July 31	Jamestown	Miss Webb, Mrs. Robinson.
	Aug. 1	Battleground	Miss Hudgins, Miss Mahler.
	Aug. 21	Colfax	Miss Hudgins, Miss Mahler.
Halifax	Jan. 20	Enfield	Miss Ward, Mrs. Maddry.
	Jan. 21	Seotland Neck	Miss Ward, Mrs. Maddry.
	Feb. 23	Aurelian Springs	Miss Hudgins.
Harnett	Feb. 17	Duke	Mrs. Hollowell, Miss Webb.
Haywood	Sept. 10	Bethel	Miss Hudgins, Mrs. Slagle.
	Sept. 11	Rock Springs	Miss Hudgins, Mrs. Slagle.
	Sept. 12	Waynesville	Miss Hudgins, Mrs. Slagle.
Henderson	Sept. 2	Liberty S. H.	Miss Hudgins, Mrs. Slagle.
	Sept. 5	Mills River	Miss Hudgins, Mrs. Slagle.
	Sept. 8	Dana	Miss Hudgins, Mrs. Slagle.
	Sept. 9	Fletcher	Miss Hudgins, Mrs. Slagle.
Hertford	Feb. 10	Winton	Miss Ward, Mrs. Maddry.
	Feb. 11	Murfreesboro	Miss Ward, Mrs. Maddry.
	Feb. 18	Ahoskie	Miss Ward, Mrs. Maddry.
Hoke	July 29	Raeford	Mrs. Hutt, Miss Clement.
Hyde	Jan. 22	Swan Quarter	Miss Ward, Miss Carroll.
	Jan. 23	Sladesville	Miss Ward, Miss Carroll.
Iredell	July 29	Cool Springs	Mrs. Hollowell, Miss Parris.
	July 30	Eupeptic Springs	Mrs. Hollowell, Miss Parris.
	Aug. 1	Test Farm	Mrs. Hollowell, Miss Parris.
	Aug. 14	Mooreville	Miss Webb, Mrs. Robinson.
Jackson	Sept. 26	Cullowhee	Miss Hudgins.

## WOMEN'S INSTITUTES, 1914—Continued.

County	Date	Place	Lecturers
Johnston.....	Jan. 15	Pleasant Hill.....	Miss Webb, Mrs. Hollowell.
	Jan. 15	Micro.....	Miss Ward, Miss Carroll.
	Jan. 16	Sandy Grove.....	Miss Webb, Mrs. Hollowell.
Jones.....	Feb. 5	Pollocksville.....	Miss Hudgins, Miss Mahler.
Lee.....	Oct. 9	Broadway.....	Miss Hudgins, Miss Scott.
	Oct. 10	Sanford.....	Miss Hudgins, Miss Scott.
Lenoir.....	Jan. 24	LaGrange.....	Miss Hudgins, Miss Mahler.
	Feb. 11	Kinston.....	Miss Hudgins, Miss Mahler.
Macon.....	Sept. 21	Franklin.....	Miss Hudgins, Mrs. Slagle.
	Sept. 22	Maxwell S. H. ....	Miss Hudgins, Mrs. Slagle.
	Sept. 23	Otto.....	Miss Hudgins, Mrs. Slagle.
	Sept. 24	West Hill.....	Miss Hudgins, Mrs. Slagle.
	Sept. 25	Higdonville.....	Miss Hudgins, Mrs. Slagle.
Madison.....	Sept. 28	Marshall.....	Miss Hudgins, Mrs. Slagle.
	Sept. 29	Mars Hill.....	Miss Hudgins, Mrs. Slagle.
Martin.....	Jan. 22	Oak City.....	Miss Ward, Mrs. Maddy.
	Feb. 7	Williamston.....	Miss Ward, Mrs. Maddy.
McDowell.....	Aug. 7	Marion.....	Mrs. Hollowell, Miss Parris.
Mecklenburg.....	Aug. 13	Huntersville.....	Miss Webb, Mrs. Robinson.
	Aug. 17	Carolina Academy.....	Mrs. Hutt, Miss Clement.
	Aug. 18	Mint Hill.....	Mrs. Hutt, Miss Clement.
	Mar. 6	Biddle University.....	Miss Hudgins.
	June 4	Biddle University.....	Mrs. Orr.
Mitchell.....	Aug. 12	Bakersville.....	Miss Parker, Miss Arey.
	Aug. 13	Spruce Pine.....	Miss Parker, Miss Arey.
Montgomery.....	Aug. 1	Candor.....	Mrs. Hutt, Miss Clement.
	Aug. 4	Star.....	Mrs. Hutt, Miss Clement.
	Aug. 5	Troy.....	Mrs. Hutt, Miss Clement.
	Aug. 6	Mt. Gilead.....	Mrs. Hutt, Miss Clement.
Moore.....	July 24	Bethlehem Church.....	Mrs. Hutt, Miss Clement.
	July 25	Glendon.....	Mrs. Hutt, Miss Clement.
	July 27	Cameron.....	Mrs. Hutt, Miss Clement.
	July 28	Aberdeen.....	Mrs. Hutt, Miss Clement.
	July 30	West End.....	Mrs. Hutt, Miss Clement.
	July 31	Big Oak.....	Mrs. Hutt, Miss Clement.
Nash.....	Jan. 15	Stanhope.....	Miss Hudgins, Miss Webb.
	Jan. 16	Nashville.....	Miss Hudgins, Miss Webb.
New Hanover.....	Jan. 31	Wrightsboro.....	Mrs. Hollowell, Miss Webb.
Northampton.....	Feb. 12	Conway.....	Miss Ward, Mrs. Maddy.
	Feb. 13	Lasker.....	Miss Ward, Mrs. Maddy.
	Feb. 14	Rich Square.....	Miss Ward, Mrs. Maddy.
Onslow.....	Feb. 4	Harris Creek S. H. ....	Miss Hudgins, Miss Mahler.
	Feb. 12	Richlands.....	Miss Hudgins, Miss Mahler.
Orange.....	Aug. 22	Hillsboro.....	Miss Hudgins, Miss Mahler.
Pamlico.....	Feb. 9	Bayboro.....	Miss Hudgins, Miss Mahler.
Pasquotank.....	Feb. 4	Elizabeth City.....	Miss Ward, Mrs. Maddy.
	Feb. 5	Salem.....	Miss Ward, Mrs. Maddy.
Pender.....	Jan. 29	Atkinson.....	Mrs. Hollowell, Miss Webb.
	Feb. 2	Burgaw.....	Mrs. Hollowell, Miss Webb.
	Feb. 3	Willard.....	Miss Hudgins, Miss Mahler.
	Mar. 17-18	Watha.....	Miss Hudgins, Mrs. Hollowell.
Perquimans.....	Nov. 4-5	Watha.....	Miss Hudgins, Mrs. Hutt.
	Jan. 30	Hertford.....	Miss Ward, Miss Carroll.
Person.....	July 28	Chublake.....	Miss Hudgins, Miss Mahler.
Pitt.....	Jan. 17	Grimesland.....	Miss Ward, Miss Carroll.
	Jan. 23	Grifton.....	Miss Hudgins, Miss Webb.
	Feb. 14	Greenville.....	Miss Hudgins, Miss Mahler.

## WOMEN'S INSTITUTES, 1914—Continued.

County	Date	Place	Lecturers
Polk.....	Sept. 7	Columbus.....	Miss Hudgins, Mrs. Slagle.
Randolph.....	July 25	Pleasant Ridge.....	Miss Webb, Mrs. Robinson.
	July 27	Liberty.....	Miss Webb, Mrs. Robinson.
	July 28	Providence S. H.....	Miss Webb, Mrs. Robinson.
	Aug. 3	Seagrove.....	Miss Webb, Mrs. Robinson.
	Aug. 4	Farmer.....	Miss Webb, Mrs. Robinson.
Richmond.....	Aug. 3	Ellerbe Springs.....	Mrs. Hutt, Miss Clement.
	Aug. 10	Rockingham.....	Mrs. Hutt, Miss Clement.
	Oct.		
Robeson.....	30-31	Rockingham.....	Mrs. Hutt.
	Jan. 19	Antioch.....	Mrs. Hollowell, Miss Mahler.
	Jan. 20	Lumber Bridge.....	Mrs. Hollowell, Miss Mahler.
	Jan. 23	St. Paul.....	Mrs. Hollowell, Miss Mahler.
	Feb. 12	Fairmont.....	Mrs. Hollowell, Miss Webb.
Rockingham.....	Oct. 17	Back Swamp.....	Mrs. Hutt.
	July 31	Ruffin.....	Miss Hudgins, Miss Mahler.
	Aug. 13	New Bethel.....	Miss Hudgins, Miss Mahler.
Rowan.....	Aug. 14	Stoneville.....	Miss Hudgins, Miss Mahler.
	Aug. 8	Rockwell.....	Miss Webb, Mrs. Robinson.
	Aug. 10	China Grove.....	Miss Webb, Mrs. Robinson.
	Aug. 15	Mount Ulla.....	Miss Webb, Mrs. Robinson.
	Aug. 21	Liberty S. H.....	Mrs. Hutt, Miss Clement.
Rutherford.....	Aug. 22	Woodleaf.....	Mrs. Hollowell, Miss Arcy.
	Aug. 8	Forest City.....	Mrs. Hollowell, Miss Arcy.
	Aug. 10	Golden.....	Mrs. Hollowell, Miss Arcy.
Sampson.....	Aug. 14	Dobbins S. H.....	Mrs. Hollowell, Miss Arcy.
	Jan. 17	Newton Grove.....	Mrs. Hollowell, Miss Mahler.
	Jan. 26	Piney Green.....	Mrs. Hollowell, Miss Mahler.
	Jan. 27	Garland.....	Mrs. Hollowell, Miss Mahler.
	Jan. 28	Harrells Store.....	Mrs. Hollowell, Miss Mahler.
Stanly.....	Jan. 31	Beulah S. H.....	Miss Hudgins, Miss Mahler.
		Clinton (colored).....	Miss Hudgins.
	Aug. 6	Endy S. H.....	Miss Webb, Mrs. Robinson.
	Aug. 7	Norwood.....	Mrs. Hutt, Miss Clement.
	Aug. 7	Richfield.....	Miss Webb, Mrs. Robinson.
Stokes.....	Aug. 11	Walnut Cove.....	Miss Hudgins.
	Aug. 12	Danbury.....	Miss Hudgins.
Surry.....	Aug. 17	Piney Grove Church.....	Miss Hudgins, Miss Mahler.
	Aug. 18	Pilot Mountain.....	Miss Hudgins, Miss Mahler.
Swain.....	Sept. 14	Bryson City.....	Miss Hudgins, Mrs. Slagle.
Transylvania.....	Sept. 3	Selma.....	Miss Hudgins, Mrs. Slagle.
	Sept. 4	Blantyre.....	Miss Hudgins, Mrs. Slagle.
Tyrrell.....	Jan. 27	Columbia.....	Miss Ward, Miss Carroll.
Union.....	Aug. 13	Marshville.....	Mrs. Hutt, Miss Clement.
	Aug. 14	Marvin.....	Mrs. Hutt, Miss Clement.
	Aug. 15	Waxhaw.....	Mrs. Hutt, Miss Clement.
Washington.....	Aug. 19	Indian Trail.....	Mrs. Hutt, Miss Clement.
	Jan. 28	Creswell.....	Miss Ward, Miss Carroll.
	Feb. 6	Plymouth.....	Miss Ward, Mrs. Maddry.
Watauga.....	Sept. 21	Valle Crucis.....	Miss Ward, Miss Cassidey.
	Sept. 23	Boone.....	Miss Ward, Miss Cassidey.
Wayne.....	Jan. 26	Seven Springs.....	Miss Hudgins, Miss Mahler.
	Jan. 27	Memorial Church.....	Miss Hudgins, Miss Mahler.
	Jan. 28	Falling Creek.....	Miss Hudgins, Miss Mahler.
	Jan. 29	Smith's Chapel.....	Miss Hudgins, Miss Mahler.
Wilkes.....		Dudley (Colored).....	Miss Hudgins
	Aug. 3	Millers Creek.....	Miss Hudgins, Miss Mahler.
	Aug. 4	Beaver Creek.....	Miss Hudgins, Miss Mahler.
	Aug. 5	Boomer.....	Miss Hudgins, Miss Mahler.
	Aug. 6	New Hope Church.....	Miss Hudgins, Miss Mahler.



## WOMENS' INSTITUTE—Continued.

County	Date	Location	Lecturers
Wilkes.....	Aug. 7	Clingman S. H.....	Miss Hudgins, Miss Mahler.
	Sept. 4	Trap Hill.....	Miss Ward, Miss Cassidey.
Wilson.....	Jan. 16	Stantonsburg.....	Miss Ward, Miss Carroll.
	Jan. 17	Rock Ridge.....	Miss Hudgins, Miss Mahler.
Yadkin.....	Aug. 8	Hamptonville.....	Miss Hudgins, Miss Mahler.
	Aug. 10	Boonville.....	Miss Hudgins, Miss Mahler.
Yancey.....	Aug. 8	Burnsville.....	Miss Parker, Miss Arey.
	Aug. 10	Bald Creek.....	Miss Parker, Miss Arey.
	Aug. 11	Daybook.....	Miss Parker, Miss Arey.

## LECTURERS AND SUBJECTS.

Name	No. Institutes Attended	Subjects
AREY, MISS BEULAH.....	12	Bread Making. Kitchen Conveniences.
CARROLL, MISS LAURA H.....	21	Milk in the Home. Making Pin Money.
CASSIDEY, MISS LULA.....	12	Community Organization. Sanitary Closets and Flies.
CLEMENT, MISS LINDA.....	25	School Lunches. Bread Making.
HOLLOWELL, MRS. W. R.....	53	Care of Infants. Value of Foods. Bread Making. The Country Woman and Her Relation to Home and Community.
HUDGINS, MISS CARRIE.....	65	The Country Home. Child Training. Canning. Home Nursing.
HUTT, MRS. W. N.....	30	Influence of Foods. Care of Infants. What to Do Till the Doctor Comes.
MAHLER, MISS LOUISE.....	50	Kitchen Conveniences. Biscuit Demonstration. Bread Making.
PARKER, MISS KATHARINE.....	10	Breads and Bread Making. Health Hints.
PARRIS, MISS MARIA.....	18	Bread Making. Salads.
ROBINSON, MRS. J. W.....	27	Sanitation in Country. Curing of Meat.
SLAGLE, MRS. HENRY.....	25	Home Conveniences. Country Women's Organizations.
WARD, MISS JANE E.....	38	Home Care of the Sick. Bread Making.
WEBB, MISS LUCIE.....	53	Fireless Cooker. Bread Making.

## County and Local Women's Organizations.

The plan of organization of the women's institute is similar to that for men. Active interested women are selected for chairmen and secretaries and they are given the best committees that can be selected to assist them. The officers and committees are expected to work up interest in women's institutes and endeavor to get the coöperation of the progressive farm women of the community in securing attendance at their local meetings and also at the annual institutes. They are expected to hold meetings at their convenience during the year to discuss among themselves questions pertaining to their work. They should invite the women of the community to join them at their meetings and take part in the discussions.

## CHAIRMEN WOMEN'S INSTITUTE COMMITTEES.

Alamance:		
Maywood.....	Mrs. B. M. Faucette.....	Burlington.
Hawfields.....	Miss Mamie Schoo.....	Haw River.
Alexander.....	Mrs. W. J. Reece.....	Liledoun.
Alleghany.....	Mrs. T. J. Carson.....	Sparta.
Scottsville.....	Mrs. E. K. Plummer.....	Scottsville.
Anson.....	Mrs. J. G. Boylin.....	Wadesboro.
McFarlan.....	Mrs. W. G. McLendon.....	McFarlan.
Polkton.....	Mrs. L. L. Cameron.....	Polkton.
Ashe.....	Mrs. C. H. Smithdeal.....	Jefferson.
Grassy Creek.....	Mrs. Ed. Greer.....	Grassy Creek.
Beaufort.....	Mrs. H. W. Carter.....	Washington.
Bath.....	Mrs. T. A. Brooks.....	Bath.
Aurora.....	Mrs. B. T. Bonner.....	Aurora.
Pantego.....	Mrs. J. B. Respass.....	Pantego.
Bertie.....	Miss Clara M. Pigg.....	Coleraine.
Bladen.....	Mrs. M. R. Roberson.....	Tarheel.
Brunswick.....	Mrs. Jack Johnson.....	Winnabow.
Mt. Pisgah.....	Mrs. G. W. Kirby.....	Supply.
Buncombe.....	Miss Dala Alexander.....	Swannanoa.
Cabarrus.....	Mrs. G. F. Barnhardt.....	Concord.
Rimer.....	Mrs. J. A. Suther.....	Conecord.
Caldwell:		
Granite Falls.....	Mrs. J. M. Yount.....	Granite Falls.
Oak Hill.....	Miss Little Deal.....	Lenoir.
Camden.....	Mrs. J. B. Anderson.....	Camden.
Carteret.....	Mrs. H. F. Pridgen.....	Newport.
Caswell.....	Miss Bessie Thompson.....	Leasburg.
Semora.....	Mrs. Geo. Lansdell.....	Semora.
Chatham.....	Mrs. D. L. Webster.....	Siler City.
Cherokee.....	Mrs. Geo. Walker.....	Andrews.
Ranger.....	Mrs. B. L. Fox.....	Ranger.
Murphy.....	Mrs. C. A. Brown.....	Murphy.
Clay.....	Mrs. G. M. Cherry.....	Hayesville.
Brasstown.....	Miss Cenie Clayton.....	Brasstown.
Cleveland.....	Mrs. W. H. Crowder.....	Lattimore.
Columbus.....	Mrs. L. C. White.....	Vineland.
Old Doek.....	Miss Ethel Snow.....	Old Doek.
Mt. Tabor.....	Mrs. Viola Carmichael.....	Mt. Tabor.
Chowan.....	Mrs. Jas. A. Boyce.....	Edenton.
Craven.....	Miss Reba Morton.....	New Bern, No. 2.
Ernul.....	Mrs. T. J. Eaton.....	Vanceboro.
Cumberland:		
King Hiram.....	Miss P. M. Pool.....	Hope Mills.

## CHAIRMEN WOMEN'S INSTITUTE COMMITTEES—Continued.

Currituck:		
Coinjock.....	Miss Nettie Overton.....	Coinjock.
Newbern's Landing.....	Mrs. J. M. Newbern.....	Jarvisburg.
Davidson:		
Clarksburg.....	Mrs. M. M. A. Baker.....	Thomasville.
Enterprise.....	Mrs. M. E. Mock.....	Enterprise.
Cedar Springs.....	Mrs. J. R. Crouse.....	Cid.
Boston S. H.....	Mrs. B. E. Payne.....	Thomasville.
Davie.....	Mrs. J. B. Tabor.....	Farmington.
Center Church.....	Mrs. W. A. Griffin.....	Mocksville.
Duplin.....	Mrs. Jas. Albritton.....	Calypso.
Concord S. H.....	Mrs. S. W. Newkirk.....	Magnolia.
Durham:		
Mineral Springs.....	Mrs. Tom Hicks.....	Gorman.
Lowe's Grove.....	Miss Carrie Green.....	Durham.
Bahama.....	Mrs. J. W. Newstead.....	Bahama.
Edgecombe.....	Mrs. B. F. Shelton.....	Speed.
Forsyth:		
Clemmons.....	Mrs. T. W. Griffith.....	Clemmons.
Belew's Creek.....	Mrs. Essi Strader.....	Walnut Cove.
Burke's Grove.....	Mrs. H. W. Johnson.....	Winston-Salem, No. 1.
Cold Spring.....	Mrs. C. E. Everett.....	Winston-Salem, No. 6.
Franklin.....	Miss Mary Arrington.....	Louisburg.
Gaston.....	Mrs. Lilly Kiser.....	Crouse.
Gates.....	Miss Betti Harrell.....	Eure.
Granville.....	Mrs. J. H. Perry.....	Creedmoor.
Stovall.....	Mrs. I. Green.....	Stovall.
Guilford:		
Battleground.....	Mrs. J. L. Hawkins.....	Brown Summit.
Colfax.....	Miss Mattie Gibbons.....	Colfax.
Pleasant Garden.....	Mrs. Frank Foust.....	Pleasant Garden.
McLeansville.....	Mrs. W. S. Dick.....	McLeansville.
Jamestown.....	Mrs. Emma Horney.....	Jamestown.
Halifax.....	Mrs. Enoch Simmons.....	Scotland Neck.
Aurelian Springs.....	Mrs. J. R. Patterson.....	Littleton.
Haywood.....	Mrs. J. H. Plott.....	Canton.
Rock Springs.....	Mrs. A. J. McCracken.....	Clyde.
Waynesville.....	Miss Mary Davis.....	Waynesville.
Henderson.....	Mrs. J. P. Fletcher.....	Fletcher.
Liberty.....	Mrs. Nannie Worley.....	Hendersonville.
Mills River.....	Mrs. Frank Cathey.....	Fletcher.
Dana.....	Mrs. R. H. Seadin.....	Dana.
Hertford.....	Mrs. J. C. Scarborough.....	Winton.
Ahoskie.....	Mrs. B. E. Copeland.....	Ahoskie.
Hoke.....	Mrs. T. B. Upchurch.....	Racford.
Hyde.....	Miss Susan A. Braddy.....	Scranton.
Iredell:		
Cool Spring.....	Miss Mabel Swan.....	Elmwood.
Eupeptic Springs.....	Mrs. R. L. Alexander.....	Harmony.
Mooreville.....	Mrs. C. V. Alexander.....	Mooreville.
Jackson.....	Mrs. A. C. Reynolds.....	Cullowhee.
Jones.....	Mrs. G. R. Hughes.....	Pollocksville.
Johnston:		
Pleasant Hill.....	Mrs. J. W. Creech.....	Benson.
Sandy Grove.....	Mrs. Herman Blackman.....	Beasley.
Micro.....	Mrs. Maxwell.....	Micro.
Lenoir.....	Mrs. Bessie Vick.....	Gritton.
Lincoln:		
Iron Station.....	Mrs. S. N. Brown.....	Iron Station.
Reepsville.....	Mrs. L. S. Kiser.....	Reepsville.
McDowell.....	Mrs. Chas. Burgin.....	Old Fort.
Macon.....	Mrs. Geo. Bidwell.....	Franklin.

## CHAIRMEN WOMEN'S INSTITUTE COMMITTEES—Continued.

<b>Macon:</b>		
Maxwell School.....	Mrs. T. M. Slagle.....	Franklin.
Otto.....	Mrs. Chas. McClure.....	Franklin.
West Mills.....	Miss Nannie West.....	West Mills.
Higdonville.....	Miss Sallie Gray.....	Cullasaja.
<b>Madison:</b>	Mrs. R. L. Runion.....	Mars Hill.
Marshall.....	Miss Ollie Hendricks.....	Marshall.
<b>Martin:</b>	Mrs. T. W. Davenport.....	Oak City.
<b>Mecklenburg:</b>		
Huntersville.....	Mrs. R. E. Henderson.....	Huntersville.
Carolina Academy.....	Mrs. Badger Bryant.....	Matthews.
Bains Academy.....	Mrs. Thos. Mann.....	Matthews.
<b>Mitchell:</b>	Mrs. M. J. Bowditch.....	Toecane.
<b>Montgomery:</b>	Mrs. Claudius Dockery.....	Troy.
Candor.....	Mrs. O. W. Burkhead.....	Candor.
Star.....	Mrs. Jonah Leech.....	Star.
Mt. Gilead.....	Mrs. L. P. Bird.....	Mt. Gilead.
<b>Moore:</b>		
Bethlehem Church.....	Miss Cecil Seawell.....	Carthage.
Glendon.....	Mrs. M. E. Maness.....	Glendon.
Cameron.....	Mrs. H. P. McPherson.....	
Aberdeen.....	Miss Mary Page.....	
West End.....	Miss Mary VonCannon.....	West End.
Big Oak.....	Miss Blanche McKinnon.....	Biscoe.
<b>Nash:</b>		
Stanhope S. H.....	Mrs. Robt. Ricks.....	Stanhope.
Battleboro.....	Mrs. T. E. Powell.....	Whitakers.
New Hanover.....	Mrs. E. T. Herring.....	Wilmington.
<b>Northampton:</b>	Miss Luella Brown.....	George.
Conway.....	Mrs. Chas. J. Garriss.....	Conway.
Lasker.....	Mrs. J. S. Rose.....	Lasker.
<b>Onslow:</b>	Miss Macy Weeks.....	Richlands.
Harris Creek.....	Miss Elva Walton.....	Jacksonville.
Orange.....	Mrs. A. H. Rimer.....	Hillsboro.
Pamlico.....	Mrs. G. T. Farnell.....	Bayboro.
Pasquotank.....	Mrs. R. N. Morgan.....	Elizabeth City.
Salem.....	Mrs. S. J. Parsons.....	Weeksville.
<b>Pender:</b>	Mrs. J. Carvin.....	Atkinson.
Burgaw.....	Mrs. D. W. Murray.....	Burgaw.
Willard.....	Miss Bettie Hall.....	Rose Hill.
Watha.....	Mrs. L. B. Saunders.....	Watha.
<b>Person:</b>	Mrs. Ella Winstead.....	Woodsdale.
<b>Pitt:</b>		
Grimesland.....	Mrs. C. M. Jones.....	Grimesland.
Grifton.....	Mrs. M. L. Worthington.....	Grifton.
<b>Polk:</b>	Mrs. Saml. Edwards.....	Tryon.
<b>Randolph:</b>		
Pleasant Ridge.....	Mrs. C. E. Macon.....	Ramseur.
Liberty.....	Miss Ida Williams.....	Liberty.
Seagrove.....	Mrs. D. A. Cornelison.....	Seagrove.
Farmer.....	Mrs. Frances Hubbard.....	Farmer.
<b>Richmond:</b>	Mrs. J. O. Ellerbe.....	Rockingham.
Ellerbe.....	Mrs. E. L. Pegram.....	Ellerbe.
<b>Robeson:</b>		
Antioch.....	Mrs. L. B. Skipper.....	Red Springs.
Lumber Bridge.....	Mrs. L. C. Hubbard.....	Lumber Bridge.
St. Paul.....	Mrs. J. C. Blanchard.....	St. Paul.
Fairmont.....	Mrs. E. B. Hayes.....	Fairmont.
<b>Rockingham:</b>		
Ruffin.....	Mrs. J. L. Williams.....	Pelham.
New Bethel.....	Mrs. John Wilson.....	Madison.
Stoneville.....	Mrs. Wm. A. Roberts.....	Stoneville.

## CHAIRMEN WOMEN'S INSTITUTE COMMITTEES—Continued.

Rowan:		
Rockwell.....	Mrs. M. J. Cline.....	Gold Hill.
China Grove.....	Mrs. Robt. Grey.....	China Grove.
Mt. Ulla.....	Miss Nannie Hart.....	Mooreville.
Liberty S. H.....	Mrs. N. J. Goodman.....	Gold Hill.
Rutherford.....	Mrs. L. E. Rollins.....	Rutherfordton.
Ellenboro.....	Miss Ida Green.....	Ellenboro.
Sampson:		
Newton Grove.....	Mrs. Geo. Warren.....	Newton Grove.
Piney Green.....	Mrs. A. P. Howard.....	Salemberg.
Garland.....	Mrs. J. D. Johnson.....	Garland.
Harrells Store.....	Mrs. J. C. Melvin.....	Kerr.
Beulah.....	Miss Elizabeth Hobbs.....	Clinton.
Scotland.....	Mrs. J. T. John.....	John Station.
Stanly.....	Mrs. M. J. Lysterly.....	Richfield.
Endy S. H.....	Mrs. Eliza J. Kelly.....	Big Lick.
Norwood.....	Mrs. J. C. Dunlap.....	Norwood.
Stokes:		
Walnut Cove.....	Mrs. Mildred Alley.....	Germanton.
Danbury.....	Miss Lizzie Adkins.....	Red Shoals.
Surry:		
Pilot Mountain.....	Mrs. R. E. L. Flippin.....	Pinnacle.
Piney Grove.....	Miss Olivia Jackson.....	White Plains.
Swain.....	Miss Emma Smiley.....	Bryson City.
Transylvania.....	Mrs. G. T. Glazener.....	Brevard.
Blantyre.....	Miss Susan Smith.....	Blantyre.
Tyrrell.....	Mrs. H. T. Davenport.....	Columbia.
Union:		
Marshville.....	Mrs. J. Z. Green.....	Marshville.
Marvin.....	Miss Annie Ezzell.....	Waxhaw.
Waxhaw.....	Mrs. H. A. Helms.....	Mineral Springs.
Indian Trail.....	Mrs. J. A. Crowell.....	Indian Trail.
Vance.....	Miss Mary Burwell.....	Kittrell.
Wake.....	Mrs. John Broughton.....	Zebulon.
Warren.....	Mrs. F. P. Bowden.....	Manson.
Washington.....	Mrs. J. W. Starr.....	Creswell.
Wayne:		
Seven Springs.....	Mrs. C. W. Ivy.....	Seven Springs.
Memorial Church.....	Mrs. Florence Hooks.....	Fremont.
Falling Creek.....	Mrs. E. A. Stevens.....	Goldsboro, No. 4.
Smith's Chapel.....	Mrs. Mary Woodburn.....	Mt. Olive.
Wilkes:		
Clingman S. H.....	Miss Nettie Calloway.....	Ronda.
Millers Creek.....	Mrs. M. F. Bumgarner.....	Wilkesboro.
Beaver Creek.....	Miss Beulah Ferguson.....	Ferguson.
Boomer.....	Mrs. J. H. Eller.....	Boomer.
New Hope.....	Miss Sallie Tevepaugh.....	Gilreath.
Wilson.....	Mrs. B. J. Thompson.....	Stantonsburg.
Rock Ridge.....	Miss Annie Boyette.....	Wilson.
Yadkin.....	Mrs. J. W. Reece.....	Booneville.
Hamptonville.....	Mrs. Lula Angell.....	Hamptonville.
Yancey:		
Bald Creek.....	Mrs. W. J. Wayeaster.....	Bald Creek.
Daybook.....	Mrs. Alice Renfrow.....	Toledo.

## ATTENDANCE AT FARMERS' INSTITUTES.

County	Date	Place	Attendance		
			Men	Women	Total
Alamance.....	Aug. 17	Elon College.....	140	147	287
	Aug. 18	Maysville.....	275	190	465
	Aug. 19	Spring Graded School.....	284	146	430
	Aug. 20	Hawfield.....	143	98	241
Alexander.....	July 31	Taylorsville.....	127	5	132
Alleghany.....	Sept. 14	Glade Valley.....	50	25	75
	Sept. 15	Sparta.....	60	44	104
	Sept. 16	Whitehead.....	60	87	147
Anson.....	Aug. 8	McFarlan.....	315	255	570
	Aug. 11	Polkton.....	126	247	373
	Aug. 12	Wadesboro.....	106	84	190
	Aug. 20	Ansonville.....	165	326	491
Ashe.....	Sept. 17	Scottville.....	50	7	57
	Sept. 18	Grassy Creek.....	120	84	204
	Sept. 19	Jefferson.....	50	28	78
Avery.....	Sept. 22	Banners Elk.....	40	176	216
Beaufort.....	Jan. 19	Bath.....	46	28	74
	Jan. 20	Aurora.....	80	66	146
	Jan. 21	Washington.....	40	8	48
	Jan. 24	Pantego.....	25	25	50
	Oct. 27-				
Bertie.....	28	Bath.....	115	200	315
	Feb. 16	Mars Hill.....	55	71	126
	Feb. 17	Windsor.....	22	10	32
Bladen.....	Jan. 22	Tarheel.....	128	36	164
Brunswick.....	Feb. 3	Winnabow.....	74	25	99
	Feb. 4	Mt. Pisgah.....	84	65	149
	Feb. 6	Ash.....	65	43	108
	April 30	Southport.....	22		22
Buncombe.....	Sept. 1	Swannanoa.....	170	58	228
	Sept. 30	Sand Hill.....	115	45	160
Burke.....	Aug. 5	Hildebran.....	120	110	230
	Aug. 6	Hickory Grove.....	141	90	231
Cabarrus.....	Aug. 11	Rimer.....	275	198	473
	Aug. 12	Concord.....	120	10	130
Caldwell.....	Aug. 3	Collettsville.....	130	34	164
	Aug. 4	Hudson.....	217	88	305
Camden.....	Jan. 21	Camden C. H.....	40	35	75
Carteret.....	Feb. 10	Newport.....	136	110	246
Caswell.....	July 29	Leasburg.....	65	50	115
	July 30	Semora.....	145	165	310
Catawba.....	Aug. 14	Cloningers Farm.....	75	50	125
	Aug. 15	Rockett S. H.....	50	30	80
	Aug. 17	Catawba.....	3	1	4
	Aug. 18	Ferrells S. H.....	100	50	150
	Aug. 19	St. James S. H.....	40	25	65
	Aug. 20	Shuford's Farm.....	300	200	500
	Aug. 21	Providence S. H.....	65	45	110
	Aug. 22	Killian S. H.....	150	100	250
	Aug. 29	Minerva S. H.....	150	100	250
Chatham.....	July 24	Siler City.....	179	155	334
Cherokee.....	Sept. 15	Ranger.....	48	29	77
	Sept. 18	Murphy.....	33	27	60
	Sept. 19	Andrews.....	39	40	79
Chowan.....	Jan. 29	Edenton.....	36	24	60
Clay.....	Sept. 16	Brasstown.....	24	3	27
	Sept. 17	Hayesville.....	72	92	164

## ATTENDANCE AT FARMERS' INSTITUTES—Continued.

County	Date	Place	Attendance		
			Men	Women	Total
Cleveland.....	Aug. 11	Casat.....	176	41	217
	Aug. 12	Belwood.....	185	154	339
	Aug. 13	Shelby.....	132	38	170
	Aug. 15	Waco.....	199	146	345
Columbus.....	Feb. 7	Old Dock.....	137	70	207
	Feb. 9	Whiteville.....	81	118	199
	Feb. 10	Chadbourn.....	53	55	108
	Feb. 11	Tabor.....	76	51	131
Craven.....	Feb. 6	Beech Grove.....	96	86	182
	Feb. 7	Ernul.....	126	40	166
Cumberland.....	Jan. 21	King Hiram S. H.....	110	110	220
	Jan. 24	Stedman.....	52		52
Currituck.....	Feb. 2	Coinjock.....	80	55	135
	Feb. 3	Newbern's Landing.....	30	55	85
Davidson.....	July 24	Enterprise.....	82	75	157
	Aug. 1	Boston S. H.....	165	145	310
	Aug. 5	Cedar Springs.....	85	88	173
	Aug. 6	Clarksburg.....	90	33	123
Davie.....	July 27	Farmington.....	105	83	188
	July 28	Center Church.....	115	97	212
Duplin.....	Jan. 30	Calypso.....	275	155	430
	Feb. 2	Concord.....	147	90	237
Durham.....	July 25	Mineral Springs.....	215	199	414
	July 27	Lowe's Grove.....	180	199	379
	Aug. 21	Bahama.....	275	75	350
Edgecombe.....	April	Dixie H. S.....	250	270	520
	Jan. 19	Battleboro.....	104	44	148
Forsyth.....	July 25	Clemmons.....	210	164	374
	Aug. 15	Belew's Creek.....	230	240	470
	Aug. 19	Burke's Grove.....	155	440	595
	Aug. 20	Cold Springs.....	80	370	450
Franklin.....	Feb. 25	Louisburg.....	72	32	104
Gaston.....	Aug. 17	Sunnyside S. H.....	185	200	385
	Aug. 18	Eakers S. H.....	250	230	480
	Aug. 21	Stanley.....	100	128	228
Gates.....	Feb. 9	Eure.....	160	147	307
Granville.....	Feb. 27	Stovall.....	46	16	62
	Feb. 28	Creedmoor.....	44	33	77
Guilford.....	July 29	Pleasant Garden.....	125	98	222
	July 30	McLeansburg.....	202	196	398
	July 31	Jamestown.....	86	74	160
	Aug. 1	Battleground.....	165	250	415
Halifax.....	Aug. 21	Colfax.....	85	180	265
	Jan. 21	Scotland Neck.....	60	550	610
	Feb. 23	Aurelian Springs.....	158	210	368
Harnett.....	Feb. 17	Duke.....	110	56	166
Haywood.....	Sept. 10	Bethel.....	90	48	138
	Sept. 11	Rock Springs.....	65	30	95
	Sept. 12	Waynesville.....	28	16	44
Henderson.....	Sept. 2	Liberty S. H.....	75	88	163
	Sept. 5	Mills River.....	73	129	212
	Sept. 8	Dana.....	32	49	81
	Sept. 9	Fletcher.....	23	52	75
Hertford.....	Feb. 10	Winton.....	5	14	19
	Feb. 11	Murfreesboro.....	85	75	160
	Feb. 18	Ahoskie.....	55	87	142
Hoke.....	July 29	Raeford.....	330	310	640

## ATTENDANCE AT FARMERS' INSTITUTES—Continued.

County	Date	Place	Attendance		
			Men	Women	Total
Hyde.....	Jan. 22	Swan Quarter.....	108	60	168
	Jan. 23	Sladesville.....	70	95	165
Iredell.....	July 29	Cool Springs.....	100	85	185
	July 30	Eupeptic Springs.....	245	238	483
	Aug. 1	Test Farm.....	1,000	800	1,800
	Aug. 14	Mooresville.....	350	147	497
Jackson.....	Sept. 26	Cullowhee.....	160	72	232
Johnston.....	Jan. 15	Pleasant Hill.....	107	60	167
	Jan. 15	Micro.....	125	118	243
	Jan. 16	Sandy Grove.....	41	6	47
Jones.....	Feb. 5	Pollocksville.....	185	150	335
Lee.....	Oct. 9	Broadway.....	50	28	78
	Oct. 10	Sanford.....	80	41	121
Lenoir.....	Jan. 24	LaGrange.....	63		63
	Feb. 11	Kinston.....	51	2	53
Lincoln.....	Aug. 19	Reepsville.....	135	85	220
	Aug. 20	Lincolnton.....	85	45	130
Macon.....	Sept. 21	Franklin.....	53	9	62
	Sept. 22	Maxwell.....	30	29	59
	Sept. 23	Otto.....	50	60	110
	Sept. 24	West Hill.....	90	108	198
	Sept. 25	Higdonville.....	106	65	171
Madison.....	Sept. 28	Marshall.....	225	210	435
	Sept. 29	Mars Hill.....	115	45	160
McDowell.....	Aug. 7	Marion.....	128	31	159
Martin.....	Jan. 22	Oak City.....	73	90	163
	Feb. 7	Williamston.....	45	2	47
	June 4	Parmele (Colored).....	50	40	90
Mecklenburg.....	Aug. 13	Huntersville.....	275	73	348
	Aug. 17	Carolina Academy.....	325	373	698
	Aug. 18	Mint Hill.....	156	190	346
	March 6	Biddle University (Col.).....	245	160	405
	Sept. 4	Biddle University (Col.).....	120	130	250
Mitchell.....	Aug. 12	Bakersville.....	183	27	210
	Aug. 13	Spruce Pine.....	65	95	160
Montgomery.....	Aug. 1	Candor.....	222	158	380
	Aug. 4	Star.....	175	410	585
	Aug. 5	Troy.....	200	144	344
	Aug. 6	Mt. Gilead.....	228	389	617
Moore.....	July 24	Bethlehem Church.....	137	146	283
	July 25	Glendon.....	105	149	254
	July 27	Cameron.....	114	300	414
	July 28	Aberdeen.....	113	316	429
	July 30	West End.....	265	221	486
	July 31	Big Oak.....	110	61	171
Nash.....	Jan. 15	Stanhope.....	97	115	212
	Jan. 16	Nashville.....	42	20	62
New Hanover.....	Jan. 31	Wrightsboro.....	35	33	68
Northampton.....	Feb. 12	Conway.....	200	127	327
	Feb. 13	Lasker.....	70	18	88
	Feb. 14	Rich Square.....	75	22	97
Onslow.....	Feb. 4	Harris Creek S. H.....	201	145	346
	Feb. 12	Richlands.....	180	255	435
Orange.....	Aug. 22	Hillsboro.....	125	26	151
Pamlico.....	Feb. 9	Bayboro.....	109	106	215
Pasquotank.....	Feb. 4	Elizabeth City.....	31	30	61
	Feb. 5	Salem.....	75	63	138



## ATTENDANCE AT FARMERS' INSTITUTES—Continued.

County	Date	Place	Attendance		
			Men	Women	Total
Pender.....	Jan. 29	Atkinson.....	100	75	175
	Feb. 2	Burgaw.....	115	143	258
	Feb. 3	Willard.....	207	129	336
	March 17-18	Watha.....	231	278	509
	Nov. 4-5	Watha.....	155	200	355
Perquimans.....	Jan. 30	Hertford.....	22	-----	22
Person.....	July 28	Chub Lake.....	500	700	1,200
Pitt.....	Jan. 17	Grimesland.....	5	45	50
	Jan. 23	Grifton.....	52	85	137
	Feb. 14	Greenville.....	150	-----	150
Polk.....	Sept. 7	Columbus.....	115	79	194
Randolph.....	July 25	Pleasant Ridge.....	295	295	590
	July 27	Liberty.....	117	167	284
	July 28	Providence S. H.....	52	51	103
	Aug. 3	Seagrove.....	69	33	102
	Aug. 4	Farmer.....	150	148	298
Richmond.....	Aug. 3	Ellerbe Springs.....	202	205	407
	Aug. 10	Rockingham.....	74	72	146
Robeson.....	Jan. 19	Antioch.....	56	82	138
	Jan. 20	Lumber Bridge.....	67	53	120
	Jan. 23	St. Pauls.....	58	35	93
	Feb. 12	Fairmont.....	32	119	151
	Oct. 17	Back Swamp.....	125	75	200
Rockingham.....	July 31	Ruffin.....	85	85	170
	Aug. 13	New Bethel Academy.....	110	196	306
	Aug. 14	Stoneville.....	110	190	300
Rowan.....	Aug. 10	China Grove.....	400	375	775
	Aug. 15	Mt. Ulla.....	225	150	375
	Aug. 21	Liberty S. H.....	145	136	281
	Aug. 22	Woodleaf.....	250	250	500
Rutherford.....	Aug. 8	Forest City.....	120	17	137
	Aug. 10	Golden.....	140	80	220
	Aug. 14	Dobbin's S. H.....	225	262	487
Sampson.....	Jan. 17	Newton Grove.....	48	10	58
	Jan. 26	Piney Green.....	169	181	350
	Jan. 27	Garland.....	86	58	144
	Jan. 28	Harrell's Store.....	102	140	242
	Jan. 31	Beulah S. H.....	185	186	371
Stanly.....	March	Clinton (Colored).....	125	100	225
	Aug. 6	Endy S. H.....	145	130	275
	Aug. 7	Richfield.....	155	118	273
	Aug. 7	Norwood.....	112	87	199
Stokes.....	Aug. 11	Walnut Cove.....	110	225	335
	Aug. 12	Danbury.....	95	240	335
Surry.....	Aug. 17	Piney Grove Church.....	215	245	460
	Aug. 18	Pilot Mountain.....	300	300	600
Swain.....	Sept. 14	Bryson City.....	116	47	163
Transylvania.....	Sept. 3	Selica.....	8	24	32
	Sept. 4	Blantyre.....	48	36	84
Tyrrell.....	Jan. 27	Columbia.....	75	24	99
Union.....	Aug. 13	Marshville.....	318	137	455
	Aug. 14	Marvin.....	407	203	610
	Aug. 15	Waxhaw.....	175	44	219
	Aug. 19	Indian Trail.....	85	152	237
Washington.....	Jan. 28	Creswell.....	85	48	133
	Feb. 6	Plymouth.....	73	10	83

## ATTENDANCE AT FARMERS' INSTITUTES—Continued.

County	Date	Place	Attendance		
			Men	Women	Total
Watauga.....	Sept. 21	Valle Crucis.....	80	122	202
	Sept. 23	Boone.....	200	200	400
Wayne.....	Jan. 26	Seven Springs.....	149	165	314
	Jan. 27	Memorial Church.....	170	92	262
	Jan. 28	Falling Creek.....	135	189	315
	Jan. 29	Smith's Chapel.....	170	110	280
		Dudley (Colored).....	45	37	82
Wilkes.....	Aug. 3	Millers Creek.....	130	240	370
	Aug. 4	Beaver Creek.....	225	370	595
	Aug. 5	Boomer.....	190	330	520
	Aug. 6	Newhope Church.....	155	200	355
	Aug. 7	Clingman S. H.....	800	1,600	2,400
	Sept. 14	Trap Hill.....	200	147	347
Wilson.....	Jan. 16	Stautonsburg.....	18	46	64
	Jan. 17	Rock Ridge.....	54	36	90
Yadkin.....	Aug. 8	Hamptonville.....	155	165	320
	Aug. 10	Booneville.....	175	173	348
Yancey.....	Aug. 8	Burnsville.....	67	20	87
	Aug. 10	Bald Creek.....	155	200	355
	Aug. 11	Daybook.....	140	116	256

# NORMAL INSTITUTE PROGRAMS

## FARMERS' NORMAL INSTITUTE.

Raleigh, N. C., January 13 and 14, 1914.

### Soil Improvement—

1. Drainage—Messrs. Lynde, Baker.
2. Rotation—Messrs. Newman, Pate.
3. Fall and Winter Plowing—Messrs. Hudson, Newell, McLean.
4. Preparation of Soil—Messrs. Sherwin, McLean, Hudson, Newell.
5. Legumes and Cover Crops—Messrs. Newman, Hudson, McLean.
6. Barn and Green Manures—Messrs. Burgess, Garren.
7. Fertilizers—Messrs. Kilgore, Browne, Williams.
8. Lime—Messrs. Williams, Kilgore, Browne.

Garden and Orchard—Messrs. Hutt, Pillsbury, Shaw, Hill.

Poultry—Messrs. Kerr, Taylor, Ross.

### Animal Industry—

Work-stock, Breeding, Care, Feeding—Messrs. Roberts, Gray.  
Production of Cheap Pork—Messrs. Gray, Roberts.  
Care of Family Cow—Messrs. Eaton, Reed.

### Field Crops—

Peanuts—Mr. Browne.  
Tobacco—Mr. Moss.  
Cotton—Messrs. Newman, McLean.  
Corn—Messrs. McLean, Newman, Williams, Hudson.

Insect Pests and Spraying—Mr. Sherman.

## WOMEN'S NORMAL INSTITUTE PROGRAM.

Raleigh, N. C., January 13 and 14, 1914.

TUESDAY, JANUARY 13.

- 10:00 a. m. Kitchen Conveniences—Mrs. Hutt.  
Causes of Insanity—Dr. Anderson.  
Bread Making—Miss Mahler.
- 3:00 p. m. Care of the Sick in the Home—Mrs. Hollowell.

Woman's Work—Miss Hudgins.  
The Family Cow—Miss Carroll.

WEDNESDAY, JANUARY 14.

- 10:00 a. m. Care of the Eye—Mr. John E. Ray.  
Saving of Steps—Miss Webb.  
Care of the Baby—Dr. Carroll.
- 3:00 p. m. Care of the Teeth—Dr. Horton.  
What to Do Till the Doctor Comes—Miss Ward.

**FARMERS' NORMAL INSTITUTE.****Raleigh, N. C., July 21 and 23, 1914.****Soil Improvement—**

- Principal Soil Types in Piedmont N. C., and Their Plant Food Deficiencies—J. L. Burgess.
- Economical Means of Improvement—T. F. Parker.
- Fall and Winter Plowing—C. R. Hudson.
- Effect of Humus on Crop Yields—T. B. Parker.
- Rotation of Crops—M. J. Hendricks.
- Pastures for Profit and Soil Improvement—A. L. French.
- Green Manures—G. M. Garren.
- Barnyard Manures—R. L. Sloan.
- Protecting Drainage Systems—R. W. Scott.
- Erosion and Its Prevention—C. L. Newman.
- Winter Cover Crops—T. B. Parker.

**Commercial Fertilizers—**

- Profitable Use of Commercial Fertilizers—B. W. Kilgore.
- Mixing for Special Crops—W. F. Pate.
- Profitable Use of Lime—C. B. Williams.

**Field Crops—**

- Cotton Growing—C. L. Newman.
- Care of Cotton After Ginning—Thos. Nelson.
- Corn Culture in the Sand Hills—T. D. McLean.
- Corn Harvesting—J. P. Kerr.
- Tobacco Culture and Rotations—J. S. Cuninghnam.
- Tobacco Curing and Marketing—E. G. Moss.
- Peanuts—T. E. Browne.
- Wheat, Increasing the Yield—M. J. Hendricks.
- Oats—G. M. Garren.

**Horticulture—**

- The Apple Industry—W. N. Hutt.
- The Vegetable Garden—S. B. Shaw.
- Small Fruits—R. G. Hill.

**Live Stock—**

- Beef Cattle for Soil Building—A. L. French.
- Producing and Curing Pork—D. T. Gray.
- Care of the Family Cow—W. H. Eaton.
- The Creamery and the Farmer—A. J. Reed.
- Cow Testing—Stanley Combes.
- Poultry Feeding and Management—J. P. Kerr.
- Feeding Farm Stock—G. A. Roberts.
- Cottonseed Meal Poisoning—W. A. Withers.
- Diseases of Live Stock—W. G. Chrisman.
- Hog Cholera Prevention—F. D. Owen.

**Miscellaneous—**

- Insect Pests to be Combated—Franklin Sherman.
- Controlling Diseases of Field Crops—H. C. Young.
- Legume Bacterial Cultures—J. L. Burgess.
- Coöperation Among Farmers—W. R. Camp.
- Economics Applied to Farming—T. F. Parker.

## WOMEN'S NORMAL INSTITUTE.

Raleigh, N. C., July 21, 22 and 23, 1914.

## JULY 21.

- 10:00 a. m. Home Sanitation—Mrs. Hutt.  
Health on the Farm—Mrs. Robinson.  
Home-made Yeast—Miss Webb.  
Teeth—Dentist.  
Food and Dietetics—Miss Parris.
- 3:00 p. m. Social Life in the Country—Miss Hudgins.  
Nourishment of Children—Dr. Carroll.  
Child Training—Mrs. Hollowell.

## JULY 22.

- 10:00 a. m. Pin Money on the Farm—Miss Clement.  
Home-curing Meat—Miss Jackson.  
Care of Milk—Dr. Koonce.  
Farm Life for Girls and Its Possibilities—Miss Arey.  
Bread Making—Miss Arey.
- 3:00 p. m. Care of the Eyes—John E. Ray.  
Care of the Sick—Trained Nurse.  
Combination of Food—Miss Parris.  
Bread Demonstration—Miss Mahler.  
Training Children of the Present for Men and Women of the  
Future—Mrs. Robinson.

## JULY 23.

- 10:00 a. m. Preventable Diseases—Dr. Jordan.  
Organization—Mrs. Hollowell.  
Helpful Hints to Farmers' Wives—Mrs. Hutt.



**PROGRAM**

**OF THE**

**TWELFTH ANNUAL**

**STATE FARMERS' CONVENTION**

**AND**

**ROUND-UP INSTITUTE**

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**PULLEN HALL**  
**A. & M. College, West Raleigh, N. C.**  
**August 25, 26 and 27, 1914**

### **OFFICERS.**

PRESIDENT—S. H. HOBBS, Clinton.

FIRST VICE PRESIDENT—A. F. YARBOROUGH, Winston-Salem.

SECOND VICE PRESIDENT—W. R. ALEXANDER, Charlotte.

THIRD VICE PRESIDENT—J. P. KERR, Haw River.

SECRETARY-TREASURER—T. E. BROWNE, West Raleigh.



## PROGRAM.

TUESDAY, AUGUST 25.

- 10:30 a. m. Greetings—Dr. D. H. Hill.  
Welcome to Raleigh—His Excellency, Locke Craig.  
Our State—Major W. A. Graham.
- 11:00 a. m. Address—S. H. Hobbs, President of Convention.
- 12:00 m. Do Soils Wear Out—Prof. C. L. Newman.
- 12:30 p. m. How to Bring Up An Old Field—R. W. Scott.
- 2:00 p. m. Maintaining Soil Fertility:  
By Green Manures—C. R. Hudson and T. B. Parker.  
By Live Stock—Dan T. Gray and A. L. French.  
By Commercial Fertilizer—C. B. Williams.
- 3:30 p. m. Is There Value in Resting Land—Dr. J. A. Morris.
- 4:00 p. m. Field Demonstration—Arranged and conducted by Prof. C. L. Newman.
- 8:00 p. m. Address—Prof. M. L. Fisher, Purdue University, Lafayette, Ind.
- 8:45 p. m. Address—Prof. L. C. Corbett, Bureau of Plant Industry, Washington, D. C.

WEDNESDAY, AUGUST 26.—LIVE STOCK CONFERENCE.

CONDUCTED BY PROF. DAN T. GRAY.

- 8:00 a. m. Judging Hogs—Dan T. Gray and L. W. Shook.
- 8:40 a. m. Judging Beef Cattle—R. S. Curtis and L. W. Shook.
- 9:20 a. m. Judging Dairy Cattle—A. J. Reed and S. M. Salisbury.
- 10:00 a. m. Making Permanent Pastures in the Coastal Section—B. F. Shelton, T. B. Parker.  
Piedmont Section—F. T. Meacham, Eugene Transou.  
Mountain Section—T. L. Gwynn.
- 11:00 a. m. Temporary Pasture Rotations for the Coastal Section—G. A. Holderness.  
Piedmont Section—A. L. French.  
Mountain Section—R. W. Collett.
- 12:00 m. Illustrations of the Value of Permanent and Temporary Pastures—Tait Butler, Editor *Progressive Farmer*.
- 12:30 p. m. Corn Silage, a Supplement to Pastures—W. F. Ward, Senior Animal Husbandman, Washington, D. C.
- 2:00 p. m. Raising Our Own Work Animals and Their Economic Importance—E. R. Lloyd, Director Mississippi Experiment Station.
- 3:00 p. m. Coöperative Buying and Selling of:  
Beef Cattle and Sheep—R. S. Curtis.  
Dairy Products—W. H. Eaton.  
Poultry Products—W. J. Shuford.  
Horses—J. C. McNutt.  
Hogs—W. F. Ward, Washington, D. C.
- 4:00 p. m. Judging Horses—J. C. McNutt and S. M. Salisbury.
- 5:00 p. m. Judging Mules—G. A. Roberts and S. M. Salisbury.
- 8:00 p. m. "The Education of the Boys and Girls of North Carolina"—  
Address by Dr. T. P. Harrison.
- 8:30 p. m. "Improved Methods of Agriculture"—Illustrated address by Mr. D. R. Coker, Hartsville, S. C.

WEDNESDAY, AUGUST 26.

CONFERENCE ON COTTON AND CORN, CONDUCTED BY PROF. C. L. NEWMAN.

- 9:30 a. m. Varieties Adapted to Different Sections of the State:  
Cotton—T. J. W. Broom, Monroe, N. C.  
Corn—F. T. Meacham, Statesville, N. C.; J. F. Latham, Jessama, N. C.

- 10:45 a. m. Improving Cotton by Seed Selection on the Farm—R. Y. Winters, West Raleigh, N. C.
- 11:00 a. m. Improving Corn by Seed Selection on the Farm—G. M. Garren, Raleigh, N. C.
- 11:15 a. m. Rotations for Cotton and Corn in Eastern North Carolina—T. E. Browne, West Raleigh.
- 11:30 a. m. Rotations for Cotton and Corn in Central North Carolina—R. W. Pou, Elmwood.
- 11:45 a. m. Rotation for Corn in Western North Carolina—E. L. Perkins, Hendersonville.
- General Discussion—T. B. Parker.
- 12:15 p. m. The Fertilization of Cotton and Corn—C. B. Williams, West Raleigh, N. C.
- 12:40 p. m. Cover Crops for Cotton and Corn—C. R. Hudson, Raleigh.
- 2:00 p. m. Preparation for and Cultivation of Cotton and Corn—J. F. Diggs, Rockingham; J. A. Turlington, Salemburg; F. P. Shields, Scotland Neck.
- 2:45 p. m. What Should the Farmer Do With His Cotton Seed—B. W. Kilgore, T. B. Parker.
- 3:00 p. m. Some Important Cotton Diseases and Their Control—Prof. H. R. Fulton, West Raleigh, N. C.
- 3:20 p. m. Control of Insect Enemies:  
Cotton—Dr. Franklin Sherman, Raleigh, N. C.
- 3:40 p. m. Control of Insect Enemies:  
Corn—Prof. Z. P. Metcalf, West Raleigh, N. C.

## WEDNESDAY, AUGUST 26.

## CONFERENCE ON HORTICULTURE, CONDUCTED BY PROF. J. P. PILLSBURY.

- 8:00 a. m. "Morning Demonstration"—Inspection of Horticultural Grounds, and Seasonal Operations.
- 9:30 a. m. "The Importance of Good Seed, and How to Get It"—H. G. Hastings, Atlanta, Ga.
- 10:15 a. m. "The Value of Green Crops in Building Up the Land for Trucking." Speaker to be supplied.
- 11:00 a. m. "Trucker's Crop Rotations for Maintaining Soil Fertility." Speaker to be supplied.
- 11:45 a. m. "Labor Saving Implements in Trucking." Speaker to be supplied.
- 12:30 p. m. "Profitable Truck Crops"—R. D. Paschal, Ridgeway, N. C.
- 2:00 p. m. "The Net Value of Commercial Fertilizers on the Bearing Orchard"—J. B. Sparger, Mt. Airy, N. C.; Paul C. Lindley, Pomona, N. C.
- 2:45 p. m. "Spraying, an Orchard Necessity"—J. B. Sparger, Mt. Airy, N. C.
- 3:15 p. m. "The Value of the Home Market"—R. W. King, Raleigh, N. C.
- 4:00—6:00. "Evening Demonstration—Inspection of Greenhouse and Horticulture Laboratory, and Exhibit of Vegetable and Fruit Packages and Methods of Packing."

## WEDNESDAY, AUGUST 26.

## CONFERENCE ON TOBACCO, CONDUCTED BY E. G. MOSS, OXFORD, N. C.

- 9:30 a. m. Maintenance of Humus Supply in Tobacco Soils—E. H. Matthewson, Reidsville, N. C.
- 10:00 a. m. Methods of Preparing and Treating Plant Beds—J. J. Laughinghouse, Greenville, N. C.
- 10:30 a. m. New Methods of Sterilizing Tobacco Plant Beds—A. C. Morgan, Bureau of Plant Industry, Washington, D. C.
- 11:00 a. m. Fitting the Soil for Tobacco—O. L. Joyner, Greenville, N. C.
- 11:30 a. m. Economical Fertilization of Tobacco—E. H. Matthewson, Reidsville, N. C.

- 12:00 m. Effects of Different Forms of Potash Upon Yield and Quality of Tobacco—E. G. Moss, Oxford.
- 12:30 p.m. Effects of Different Forms of Nitrogen Upon Yield and Quality of Tobacco—E. H. Matthewson, Reidsville, N. C.
- 2:00 p.m. Utility of Machine Transplanter—O. L. Joyner, Greenville.
- 2:30 p.m. Tobacco Insects—A. C. Morgan, Bureau of Plant Industry, Washington, D. C.
- 3:00 p.m. Harvesting and Curing Tobacco—E. G. Moss, Oxford; E. H. Matthewson, Reidsville.
- 3:40 p.m. Marketing the Tobacco Crop—O. L. Joyner, Greenville.

## WEDNESDAY, AUGUST 26.

## CONFERENCE ON SMALL GRAINS AND GRASSES, CONDUCTED BY MR. J. L. BURGESS.

- 9:30 a.m. The Place of Small Grain in the Crop Rotation—E. D. Weaver, Weaverville, N. C. Discussion by T. B. Parker, Raleigh, N. C.
- 10:00 a.m. Small Grains Adapted to the Different Parts of the State—G. M. Garren, Raleigh, N. C.; T. D. McLean, Carthage, N. C., and H. K. Foster, Newton, N. C.
- 10:30 a.m. Development of Varieties of Small Grain for Different Parts of the State—Dr. George Nelson Coffey, Wooster, Ohio. Discussion by J. L. Burgess, Raleigh, N. C.
- 11:30 a.m. Preparation of the Soil for Small Grains—R. W. Freeman, Salisbury, N. C. Discussion by F. T. Meacham, of Statesville, N. C.
- 12:30 a.m. Fertilization of Wheat—M. J. Hendrix, Cana, N. C. Discussion by C. B. Williams, Raleigh, N. C.
- 2:00 p.m. What Shall We Do With Bermuda Grass?—Zeno Moore, Whitakers, N. C. Discussion by C. L. Newman, Raleigh, N. C.
- 3:00 p.m. Hay and Pasture Mixtures—Dr. W. J. McLendon, Wadesboro, N. C. Discussion by E. D. Weaver, Weaverville, N. C., and Walter Woodard, Wilson, N. C.

## THURSDAY, AUGUST 27.

- 9:00 a.m. General Plan for Community Development Organization—Dr. D. H. Hill.
- 9:15 a.m. What Community Action May Accomplish Along Health Lines—Dr. W. S. Rankin.
- 9:30 a.m. Community Action Along Productive Lines, What May be Expected of It—C. R. Hudson.
- 9:45 a.m. What May be Expected From Community Work Along Educational Lines—Prof. L. C. Brogden.
- 10:00 a.m. What Community Action Can Do for Social Life and Recreation in the Country—Dr. C. H. Poe.
- 10:15 a.m. How Standard Cotton Grades Can Benefit the Farmer—W. R. Meadows, Office of Markets, U. S. Department of Agriculture, Washington, D. C.
- 11:00 a.m. The Case of the Farmer—Judge R. W. Winston.
- 11:30 a.m. Land and Loan Associations—Hon. J. R. Young, Raleigh, N. C.
- 12:00 m. Business Meeting, Report of Committees, Election of Officers.

## PROGRAM HOUSEWIVES' CONVENTION.

State Department of Agriculture, August 25 to 27.

MRS. CHARLES MCKIMMON, *President*.MRS. C. R. HUDSON, *Secretary*.

TUESDAY MORNING, 10:15. HELD IN AUDITORIUM, MEREDITH COLLEGE.

Welcome—Major W. A. Graham, Commissioner of Agriculture.

Talk—Mr. T. B. Parker, Director of Institutes.

How the Woman in the Country Can Establish a City Market—Mrs. Rosalind Redfern.

The Housewife and Her Opportunities—Mrs. Julian Heath, Founder National Housewives' Leagues.

Attractive Packs of Eggs and Butter—Mrs. J. H. Henley.

Demonstration of Canning in Tin and Glass—Team of Canning Club Girls.

TUESDAY AFTERNOON, 3:30. HOME ECONOMICS DEPT., HIGH SCHOOL.

Class in Cooking, conducted by Miss Katharine Parker, of Simmons College, Boston, now of Department of Home Economics, Meredith.

Demonstration—Desserts.

Cooking classes will be held each afternoon at the High School Building and every one is invited to come with her note book and pencil and take these lessons free of any charge.

WEDNESDAY MORNING, 10:15. AUDITORIUM, MEREDITH COLLEGE.

President's Address—Women as Organizers: What the Club Movement Has Meant for Women.

The Housewives' League Movement: Its Birth and Growth—Mrs. Heath.

Sports and Amusements for the Rural People—Miss Emilie McVey, Dean, University of Cincinnati.

Five-Minute Talks by Club Women:

Community Club, Chapel Hill.

Magnolia Club, Wayne County.

Housewives' League, Wilmington.

Model Community Club, Salemburg.

United Farm Women's Clubs.

Canning Clubs.

Woman's Club, Raleigh.

Edgecombe County Betterment Club.

WEDNESDAY AFTERNOON, 3:30. HOME ECONOMICS DEPT., HIGH SCHOOL.

Class in Cooking, conducted by Mrs. W. N. Hutt.

Demonstration—Salads.

WEDNESDAY EVENING, 8:30. AUDITORIUM, MEREDITH COLLEGE.

Musical Recital.

Interesting Moving Picture Films and Lantern Slides.

THURSDAY MORNING, 10:15. AUDITORIUM, MEREDITH COLLEGE.

The Social Direction of Education—Dr. Rankin, State Department of Health.  
The Child and the Road—Mr. D. H. Winslow, U. S. Chief Engineer, Road Inspection.

Feeding the Child in Its Second Year—Dr. Delia Dixon-Carroll.

The Object of the Afternoon Meeting—Mrs. Sue V. Hollowell.

THURSDAY AFTERNOON, 2:30. HOME ECONOMICS DEPT., HIGH SCHOOL.

Conducted by MRS. SUE V. HOLLOWELL.

Demonstration—Proper Preparation Infants' Food.  
Comfortable Clothing.  
Proper Feeding Bottles.  
Simple Remedies for Simple Ailments.

THURSDAY AFTERNOON, 3:30.

Class in Cooking, conducted by Miss Louise Mahler.  
Demonstration—Bread and Rolls.

#### OFFICERS FOR 1915.

MRS. J. G. BOYLIN, PRESIDENT, Wadesboro, N. C.

MISS CARRIE HUDGINS, SECRETARY, Raleigh, N. C.

#### The Women's Branch of the Farmers' Institutes.

MRS. JOHN W. ROBINSON.

This is or should be the most interesting subject to farm women. Our lives are necessarily more or less isolated, and it is a great pleasure to look forward to our monthly or semi-monthly meetings with our neighbors and talk over better ways of doing things, how our children should be made "better babies," and make plans for the betterment of our homes and community.

The men are doing quite a lot through coöperation, and I am glad that the women begin to realize the need in their work also.

Eighteen months ago the women in our community organized; we have semi-monthly meetings six months in the year, and monthly meetings in the busy seasons. We have programs prepared for one year, varying them as we wish. Each member is asked to help render these programs, and the President or Secretary helps them get the literature necessary to study the different subjects. Health, cooking, care of children, conveniences, gardens, flowers, etc., are some of the subjects. Then we have demonstrations occasionally, comparison of cooking, etc. We give the corn, tomato and poultry clubs all the encouragement possible. The club members' ages are from fourteen to fifty years, and all interested. We have a query box and round table discussions at each meeting. We give ice cream suppers, picnics, old time singings, spelling bees, etc., for amusement and to help us make money for our work.

At our county fair the young people gave an excellent agricultural play—three performances. This was educational, and helped us quite a lot financially. Since we organized we have made \$250 for our school, also \$100 private subscriptions for our teacher's salary. We now have individual patent desks, nice three-room school building, painted inside and out, piano, kitchen curtains, shades, nice teacher's desk, etc.

Of course we were helped by teachers, men, women, children—all. It takes coöperation all around to make a community better.

All our meetings are held in the school building; we are making this the social center. In the grove we have swings, hammocks and a croquet ground.

Once each month a committee meets with the children and have a social afternoon, serving some light refreshments. We believe that all work and no play makes Jack or anyone else dull.

The South was once noted for its hospitality, but it is fast losing that, I am sorry to say. And it is not that we do not enjoy social life, but we have more work to do and cannot enjoy the social side of life so much. The slaves are gone and we cannot hire help for love or money. One lady said to me some time ago, "Oh, I wish we were back in the good old days of slavery." But not I. What would we do with slaves and the high cost of living? We

must learn to live in this new South, and the best way is to come together and talk the matter over.

We now have oiled floors, linoleum, iron beds, washing machines, coal, gasoline and electric irons, gasoline engines, fruit canners, oil stoves, fireless cookers, waterworks, and so many things to help us which cost far less than slaves or hired help, and if we study our work, how to do it easier, we will have plenty time for reading, club meetings, church work, etc. And we are caring for our health as well, and will not be old and worn out at forty-five years old, as so many mothers are; often dying just when their children need them most.

We certainly need to study our business, the grandest and noblest work on earth.

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### Home Making.

CARRIE HUDGINS.

The home is the heart of the farm, and the mother the heart of the home. The girls and women have largely the making of our future, and on them rests the responsibility of their being women of the highest type.

Every woman should form an ideal of a home; not the place, but the character of the home. If love reigns not there, if peace is not a dweller, if charity or contentment are not in the household, then it is no home.

The home is the greatest institution, and through it must come improvement in society; it is the pivot upon which success of the nation depends. Good men and women wield the greatest influences of the day.

The mother is the social organizer in the home, and in order to be able to fill this position she must give herself some time to the preparation it requires. She must have some reading matter, and some time set apart in which to read, that she may be prepared to assist in passing the hours pleasantly when the family meet. She plans her meals by no set rule, neither should she expect to plan her evenings; still they require some thought.

Parents should try to teach their children four fundamental virtues: honesty, reverence, sympathy, and industry. The child is a creature of environment; he needs something besides four walls and a bag of books. Touch the heart and you don't need argument.

If in training children to face the responsibility as citizens it must be the family that furnishes the highest ideal of humanity. To kill the romance of youth is to blight the future; to kill the girl's ideals and dreams may make a good servant or housewife, but she can never have the delicate charms which are woman's right. Drudgery to keep mother from it is ennobling, but acts like March wind upon the youth. Man shall not live by bread alone.

Of course some country girls and boys go to college, but the majority do not. Too many have this worked out of them by the home which looks upon it as foolishness. The girls have been left ignorant of the things which mean much to them: the art of being a home-maker, the ability to sew, cook, and make home attractive. In Europe a girl is supposed to have mastered these arts before going into society. If 'twas so with us learning would be more popular. If the country cannot afford this much time, then it cannot hope to keep the young people on the farm.

Often when our country women are questioned they say, "Yes, we do not want our sons and daughters to stay on the farm. Too much drudgery. The most of the women's work disappears down the throats of the family and seems to yield no returns."

Often our boys and girls are leaving the farm because we have not spent enough time in making the home attractive. The wide-awake boy or girl loves fun and must have it. If the home and community do not look after this they are going to look out for themselves in a way that is not always desirable. Swimming is an amusement that boys and girls always enjoy, and if no safe place is provided by the older people they will find places for themselves. The most of the accidents we hear of are boys going in without permission in some secret, hidden-away places.

Boys and girls are much alike, and rightly so; the girls love much the same sports, and it is only just and right they should have them. If a girl wishes to get out and romp and play, she is called a tomboy and made to feel she has committed a crime. This should not be so. Why not let her develop as we would the boy?

The school is a large factor in development of country life and one of the chief agencies for keeping the youth on the farm. If this is to be done, we must not only make it attractive and remunerative, but we must interest them in their work. This can be done by making the work intelligent, by carrying the every-day life into the school and making it a part of the real work.

The true, the beautiful, the good, are so closely interwoven that we need to develop them together in the growing mind. The child should be taught to cherish the truth because it is the truth; the beautiful because it tends to elevate; the good because righteousness exalteth.

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### Mothers' Problems.

MRS. HENRY SLAGLE.

If "variety is the spice of life," we have no monotony, no stagnation; but the ever urgent call to duty presses us forward to meet them, and mothers, like every other individual, should have a great master purpose, a purpose to live a life of supreme principle which is so commanding and imperative in its demands for recognition and exercise that there can be no mistaking its call. Any kind of a human being can wish for a thing, but only strong, vigorous minds can do them.

In Phillips Brooks' talks to young people he urges them to be something with all their might; and who needs to follow this admonition more than the mothers who have the God-given responsibility of turning the young minds into channels of usefulness, and getting them to see that there is a purpose and an individuality in each little life. We must care for the mind, and we must care for the heart and the body. The latter is by no means the most important, but we are inclined to dwell on it, and I, as a mother, am going to give some of my experiences and some of others.

We must begin at a very early age or in the early stages of existence to care for these little ones; they must have prenatal care for the best development. Send to the U. S. Department of Labor, Children's Bureau, and get a fine treatise on this. We can make ourselves confident and efficient by studying conditions, diseases, remedies and how to use them. If we know a thing we are confident, and do not go into a panic if some disease develops or some accident occurs, but with our own reason and experience take a simple diagnosis of the trouble. And if we have been a careful discernor of the laws of nature, and therewith developed a hygienic sense, this will enable us to more or less instinctively decide whether it is something we can manage or if the skill of a physician is needed. It is a part of my nature to be deeply interested in all these things, and it has stood me in hand many times in the rearing of my eight children. We must study causes and effects.

But now to begin at the beginning. The first thing when a baby is born get your almost indispensable roll of absorbent cotton; then your boracic acid solution which has been prepared by these proportions: two teaspoonsful of the dry powder to one-half pint water, boiled and put in a clean bottle ready for use. Take a little tab of cotton and saturate with this solution, then clean one little eye by wiping from the nose outward. Throw this in the fire and get another tab of cotton and treat the other eye in the same way. Never use the same cotton for both eyes, as one may be infected and the other not. Now this is a mild, clean disinfectant, but after you have used this get the little box containing two ampules of a one per cent nitrate of silver and get as much as one drop in each eye—more will not be harmful. These little boxes are kept now at all well equipped drug stores and have been prepared by experts. They cost only ten cents, and this will in-

sure your child against this most common cause of blindness (infant inflamed eyes or ophthalmia neonatorum). Then take a little of this cotton or fine soft cloth and put on the end of your finger and wet in the boracic solution and clean out the baby's mouth. Do this every morning until it is at least four weeks old. You can dilute this solution if you like by putting a little of it in a cup with a few spoonful of warm water. Use this treatment and your child will never have any mouth troubles. This is a fine gargle for sore throat. Also be sure to clean up the mother's breast with the same.

The child being made comfortable, the next thing will be the feeding. Do not feed anything but a little clear warm water, and put to the breast occasionally about every two hours. If the mother is in a normal condition the nourishment will be there in due time, and if she is not, the physician will advise.

You want to watch for every symptom of indigestion, as that is the cause of most baby ailments. And, mother, study your baby; this is *your* job, and keep at it. Don't be quick to give medicines. A little castor oil is often beneficial and is not harmful. If cold is the trouble, try it.

Teething soon comes on, and many think they must have a dope or a course of patent medicines for their children—but don't. First be careful with the child's diet, and keep on its bowels a flannel abdominal binder; this never allows the bowels to become chilled. You can get the light weight for fat babies summer wear, but let it be wool, and take off everything else if you like.

I will give some things for the diet of the child being weaned that Dr. Delia Dixon-Carroll, of Raleigh, gives as some of the best. First, broths. Get an old chicken, dress, cut up and break every bone in its body, as the bones contain the food for the red corpuscles of the blood. Then put this all to cook in one and one-half or two gallons of water and cook slowly for four or five hours; strain and set to cool; when cool take off most of the oil; heat again and put in small, well sterilized can, and it is ready for use. For making beef or mutton broth, take two pounds of the ribby part, break the bones and treat just as the chicken. Another thing she says is fine, and which only a few mothers know, is cowpeas cooked with meat in a good deal of water for a long time. First strain out and give only the soup with a little cream added to it; later strain the pulp through a fine colander and add to this a little butter or cream, as they are both easily digested and contain the protein that all children need. Rice or oatmeal cooked for several hours in a double boiler with a little cream or butter, and very little if any sugar, make a good meal. Avoid sweets at all times as they ferment in the stomach and cause trouble. All breads given to babies should be twice baked or brown and stale. The Zwiebach biscuit is one of the best ready prepared breads.

All mothers should be careful to not nurse their children too long, as the child at about ten months begins to change and needs something stronger, and the mother's milk begins to deteriorate and take on a poison known as ptomaine. The child will gradually get thin, pale and irritable. The time has come for other things to be given to supply the nourishment needed. This is a call for a knowledge of dietetics and the value of foods.

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### And the Girls.

LULA M. CASSIDEX.

The clear note that has been sounded throughout the land for rural uplift has aroused every institution for welfare to definite lines of activity looking to standardizing country life. The agricultural, health, and educational forces of the State and nation are striving, each in its individual way, to aid in the solution of the rural problem, and it is very evident that the standards are advancing. Many of the agencies which are busy in the work are dealing with the adult, endeavoring to serve the present generation. This is vital work, and a great evolution along all lines of rural progress is the



growing result of the strenuous efforts which are being made. However, there is a large per cent of the rural population which can never be reached through these agencies. Many are out of reach because of location; many more are unwilling to change their habits of thinking and living; and some others are incapacitated either through ignorance or through the influences of peculiar environment.

These facts are especially true of country women who, as a rule, have very little opportunity for contact with the larger movements which set the pace for their town and city sisters. Their visions of life are dwarfed in the outset, very often, by the uncompromising customs and traditions which have circumscribed their lives from early childhood—that period of life when the notions of home and the standards of living are eternally fixed in the minds of the youth, as a rule.

In view of these facts it becomes necessary to reach these conditions through the training of the youth for actual living and a conscious appreciation of the matchless possibilities of rural life by courses in our rural schools along practical lines.

No community, no home, can rise above the standard of its womanhood. The average girl is going to spend the most of her years in home making. What finer thing could be done toward home and community building and standardizing country life than to send these girls out from our schools actually prepared to fill their life missions, giving a full measure of service, and at the same time conserving their physical strength? On every hand we see the tragedy of a woman whose health, happiness, hope and ambitions have been ruthlessly sacrificed upon the altar of ignorance.

What value have Latin, algebra and kindred subjects for a girl in comparison with a course of training which shall lead her to know and practice the laws of hygiene and sanitation; which shall teach her the needs of the human system, the foods which best supply these needs, the best methods for the preparation of these foods for nature's use, the economy of time and effort, the conservation of her own strength and health while performing her duties, and the countless other lessons which are vital in the shaping up of every woman's home and life policy?

The argument of "superior cultural value," which is made in behalf of classical lines of training, weakens by comparison with industrial training when a choice has to be made between the two. True culture grows out of spiritual development and soul expansion even more than from intellectual development. What could conduce more effectively to the mental, physical and spiritual development of a girl than a course of training which fits her for the natural sphere of home, and aims at stimulating the native, womanly traits in her character, and gives her actual skill in performing gracefully and graciously the duties of home making.

What duty, then, lies *next* in the development of an efficient rural school system? What has the rural parent a right to expect from the schools? What is it their duty to demand of the schools?

These questions are finding a solution in a number of rural communities of North Carolina through certain activities which have been set in motion through the combined efforts of their teachers and the organized womanhood of the community. There are springing into existence in many rural schools domestic science classes which are serving in a modest but practical way the purpose for which they were intended—that of preparing the girls for life; and these schools are building gradually toward the only scheme of education which can be permanently efficient and effective in rural progress.

Let us see to providing training along industrial lines in our rural schools in order that, through the schools, the otherwise impossible situations may be influenced to higher standards of living, and the girls may go forth to meet the exigencies of life with a fine vision of the possibilities ahead of them and the training which shall enable them to cope with life's problems intelligently and effectively.

Whenever public sentiment begins to demand this type of rural school the teaching force will prepare to meet the demand. Experiments have demonstrated the feasibility of this line of work in rural schools having three or more teachers, and the time is now at hand to require it as an integral part of the school course.

## Farm Life and Its Possibilities for Girls.

BEULAH AREY.

Sometimes we hear it said "There is no chance on the farm for the girl." The girl has just as good a chance on the farm as she has a mind to make. The thing is to have a purpose in life, something to live for. A person without an object in life, without ambition and destitute of a settled purpose to achieve some definite end, is to be pitied. The girl who lives a listless, lazy life, satisfied with her conditions and with no ambition to do or achieve something higher, knows nothing of pleasure. One of the greatest pleasures of life is to endeavor and to overcome. Work is a blessing; idleness a curse. It is a poetical expression "that life without a plan serves merely as a soil for discontent to thrive on." Some point in view, some fixed object of pursuit, is a spur to the energies. A purpose overcomes difficulties; not with a rush and a shout, but one by one. So set your mark high; no person was ever injured or delayed in life by setting his mark high.

The very first and best thing you can do is to equip yourselves for lives of the greatest possible usefulness. This you owe first to your Creator, who in giving life to anyone gives it with a purpose. You have a life-work to perform which no other can do for you. Next you owe it to those around you. First, and this is the point I am trying to make, is the *home*, then your countrymen.

*The Home!* Think of what that word carries with it; and do we all realize what embraces a home, the magnitude of the responsibilities which rests upon the shoulders of one who undertakes to make one: No, positively I am sure we do not; and sometimes I am inclined to think we do not want to, and today this, as I see it, is why so many of us live in *houses* instead of *homes*.

Now, girls, this is your chance; your real life-work is to make a home. Be a home-maker, not a home-breaker. Well, you will say, how are we going to do this? I want to tell you that it is not done by chance; it is no "happenstance." The person that thinks if a girl can do nothing else she can make a home, or, as others might put it, "cook and keep house," had better think again. Everybody fully realizes that to be a successful farmer you must be able to do more than drive a mule to the end of a cotton row, pull him around and go back, and I am thankful that our women and girls are waking up to the fact that to be a successful home-maker you must be able to do more than fry meat and sweep the floor.

Why is it when a young girl wishes to become a trained nurse, a stenographer, a music teacher, or any other profession as far as that goes, except home-making, she prepares herself for the work? She spends years and hundreds of dollars in preparation, graduates, gets a "job," teaches until she marries, then the bar drops. She feels that her life-work has been completed instead of just beginning it, and well she might, too, for she made preparation for the former work, the latter followed as a matter of fact, and as a matter of fact this is the seat of the trouble in our homes today. Home-making is not considered a profession and therefore not studied. I hope the time will soon come when every young woman who expects to go into a home of her own will have to prepare herself for making a home, just the same as does the young man to support that home. This is nothing more than fair. It makes no difference whether or not you do your own work; if you cannot do it yourself you cannot direct anyone else. You cannot give out what you do not have yourself. If you cannot make wholesome, nourishing bread, do you suppose for a minute you can tell an ignorant person how? Why is it that labor in the home is such a problem today? Because it has not been handled intelligently and systematically. For my part I do not want any. I much prefer a well planned house equipped with the modern conveniences as my servants. These if handled intelligently will respond intelligently, and you can always depend on them.

Now here is the real problem, and we will have to solve it together. Probably you haven't a well planned house and the modern conveniences to lighten and make pleasant your work, but by keeping still is a pretty poor

way of getting them. A farmer does not or should not put a new piece of machinery on the farm until he is thoroughly capable of operating it and can get value received, and the same is true of the home, for what good would modern conveniences do if you did not know how to use them? just about as much as your Virgil would when you wanted to mix a cake. There is a solution to every problem, and when our girls study this problem of the home it will be solved to a certain extent, but it must be studied.

Now, some will say that this will cost money; but doesn't it cost money to study Greek, German or Latin? Sure it will cost money, and much valuable time too, but it is well worth the price and will pay bigger dividends than any other way it can possibly be invested. The fact that this is a very effectual way influences your life for higher efficiency, and greater contentment in the rural home makes it invaluable. Now, girls, make up your minds to have a course in home economics; you can get it if you want it bad enough. You will have some difficulties to overcome, but anything that is easily gotten is not always worth having. If you cannot leave home, get some literature and work there till you can. Anyone can obtain the government bulletins for the asking, and they are very valuable if studied carefully. Then there are good books and magazines which cost very little in comparison to what you receive from them. Read more; that is what you need; read anything that looks like a Progressive Farmer or Good Housekeeping magazine. Every one of you should have some practical books relating to your work, and should be continually on the watch for information. When you do not read the same thing happens to your mind as does a once stout and hearty body when it receives no more nourishment. Every minute that is not actively engaged in work be feeding your mind, for as every thread of gold is valuable, so is every minute of time. An hour wasted daily on trifles or in indolence would, if devoted to self-improvement, make an ignorant person wise in a few years.

I wonder how many of you know what a balanced ration is and what it means to a sound body? If a hog, and a horse, and a cow need a balanced ration, why does not a man? Is his welfare not as important as that of these animals named? Look what progress the boys are making in agriculture now. You must not lag behind. I believe in equal—not "suffrage"—but rights in education.

One way in which you can make a start at home right now is to join the girls' canning and poultry clubs; this is an open door for you. Think of the knowledge you gain in agriculture in the study of your plants, and then the experience in canning according to the best instructions, of all the good times you can have with your girl friends during the canning season, and what is better still, look at your profits. I know many girls today who are buying their clothes and helping pay their own way to college with tomato club money, and without it this would be impossible.

Now I have been telling you all the things you ought to do; I want to tell you *one* thing you ought not to do.

You have heard the expression that "all work and no play makes Jack a dull boy." It will make many a dull girl too. Do not neglect having a good time on the farm, and pretty often, too, for time spent in vacation is not lost. I fear the majority of you girls do not take the time for pleasure and relaxation. Of course you will not like the farm if you do nothing but stay at home and work, work, work. You are much better equipped for your household work on common days if you get out and mingle with other girls in some club or social.

Now a few words to the mothers. If you mean to keep your girls in the home with you, you must be their sympathetic companion. When a girl feels that her mother has no sympathy with her aspirations and desires she loses all interest in home life. Encourage her in everything new she attempts. What a world of good a few words of encouragement will do if only given in time. Give her time for recreation, give her good books, magazines and papers to read; not some your grandmother used, but the latest and best that are out. How can you expect the home-making element of a girl's life to develop unless it is fed? Encourage in her the sense of ownership by giving her something of her very own and from which she can re-

ceive a profit. It is not right that the bright, ambitious girl should be denied all these privileges.

In conclusion, I would like to say that when—and that is fast coming—our girls stay on the farm and in the home *from choice* and are taught that cooking and cleaning are based on scientific truths, dull household routine will be changed into intelligent, interesting exercise, and she will bear a more vital relation to the health and happiness of home and community.

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### Domestic Science—Its Aims and Ends.

MARIA PARRIS, Oxford College.

The importance of the study of Domestic Science is still held in doubt by many people. This is probably due first, to the fact that very few outside of schools know what work is done in this department, and secondly, because in many homes the science of feeding is an unheard of thing.

Soon after it was seen that Farmers' Institutes were teaching farmers the best and most economical diets for cows, horses, pigs, etc., a few thinking women began to realize that human beings were receiving secondary consideration in this most vital point of food.

Let us first look at some of the arguments against Domestic Science. We often hear that too much time is spent on "fancy cookery" and that the courses are not practical enough. This might have been the case years ago, when it was taught by women who had had no opportunity for study themselves. Now scientific training is required of all teachers, and the greatest stress is laid on what we call plain cooking. However the pupils are made to realize the necessity and possibilities of serving plain foods in attractive and tempting ways.

Extravagance is another fault that seems unjustly applied, for the use of "left overs" is emphasized when possible. For instance, when making grape juice, the skin and pulp that are left are converted into a nice jam or marmalade.

Domestic Science does intend to show the student just how to prepare, in the quickest manner, the most palatable and attractive dish with the material at hand. Instead of serving a soggy boiled Irish potato she learns to cook one so that it will be mealy and appetizing.

She is also shown the different methods of cooking that make foods digestible instead of indigestible. When she puts these methods into practice at home she will vary the monotony of eggs fried in grease for such as soft-boiled, and poached eggs on toast.

Just as farmers have already learned that particular kinds of food are needed for horses and pigs, so the Domestic Science pupil is taught that human beings require certain amounts of different types of food to insure good health and proper nourishment of the body. Along this line a thorough knowledge of the composition and right combinations of food is taught. As a result, fresh fruits and vegetables and good clean milk, that are so necessary in our daily diets, will be seen more often on the table, in the place of heavy meats three times a day. So many women sell the nourishing foods that they have, such as eggs and milk, and then buy tonics for the family.

Along with these things lessons are learned in the care of a house and the necessity of a home built for comfort and convenience, instead of one for show.

A woman that could make the best cake, and one who stayed home and drudged day in and day out, for fear of a newspaper being out of place or a rug not exactly straight, used to be considered the best housekeeper.

Things have changed now, and the woman who has a clean, comfortable home for her family and gives them nourishing food, and still has time for her church and community, is held up as an example for others, and towards making more of this kind Domestic Science strives.

Just as soon as the public realize that good health depends almost entirely on the food we eat, then Domestic Science will be compulsory instead of elective in our schools.

## The Farm as a Home.

A. L. FRENCH.

One night I was driving far from any home and far from any town; and realizing that my little mares had already carried me further that day than they should have been asked to do, I sought a stopping place for the night.

Off to the right of the ridge road I was traveling, down in the center of a charming little valley—along the edge of which I had been traveling for fifteen miles or more—sparkled the bright lights of a farm home, and I turned the little mares in this direction. Do you know that you can judge quite closely many times of the quality of a home, in the country, by the character of the lights at night as seen from a distance? A well illuminated room speaks of good cheer and hospitality, and the lights shining clear and strong off into the night indicate that the window lights are clean and shining.

My apology for intruding at that time of the night was cut short by the good lady of the house with the assertion that they deemed it no intrusion for a stranger to join their family circle for a night, and the kindly look in her eye and the hearty handclasp from the head of the house assured me that I had run accidentally upon the "real thing" in country hospitality.

And as the evening progressed, with music, games, stories, and discussion of the weighty problems connected with living and home-making of that time, the impression grew upon me that I had come upon one more of those pillars upon which our great country has been builded, viz., the country home, where dwell intelligent, patriotic, home-loving, well-to-do people.

As I stepped into the big living room there by the great open fire-place sat the aged grandmother, and in her lap lay a copy of the latest issue of the *Ladies Home Journal*, and—bless her old heart—she had been studying the fashion page. But—and right here I stumbled onto one of the reasons for the well-dressed, well-to-do, look of all the children in that large family—grandma was not studying fashions for her own benefit, but was aiding in planning a new winter suit for the oldest daughter of the house. And a little quiet observation showed me that the material of all the ladies' gowns was of the most substantial sort and had not the home maintained, in the person of the grandmother, wife and eldest daughter, a first-class dressmaking plant, the dressmaking bill of that home would have cut deeply into the revenue from the farm.

The books and papers on the large center-table attracted my attention. There was the *Chicago Advance*, the great "Congregational" church paper of that section, and hovering close to the *Advance* was *The Breeder's Gazette* and *Wallace's Farmer*, and a copy of the new *Saturday Evening Post*—then just starting under the present ownership. The *New York Tribune* spoke to me of the soundness of the politics of the man of the house, and the *Century*, *St. Nicholas*, *Independent*, and *Youth's Companion* of the clean thinking of all the members of the family. Then, of course, along with these high-class papers and magazines we would naturally expect to find Longfellow, Scott, Moore, Tennyson, Shakespeare, and some of the standard works of fiction, and all of them with marks indicating that they were not being kept for show. And in the book cases the standard histories and latest dictionaries told more plainly than could words of the constant mind training of all the members of the family.

One of the young ladies upon being asked if the young folks did not get lonesome at times, living so many miles from town, replied: "Oh, no; we don't have time. All the younger ones go to school and when they return home have certain jobs of work to attend to before supper; then we who stay at home have the housekeeping to look after and the care of the poultry and butter-making devolves upon us also. Then after we have the supper work finished there is the music, and then one night each week our literary society has a meeting at the schoolhouse, and of course we have a party or sleigh-ride now and then. If we had any more to occupy our evenings I don't see how we would find time to do the reading we want to do in order to keep up with the times."

That is the point: those who spend their time "gabbling" and running about have not sufficient time to commune with the people of big brain power who present their thoughts on paper, and this to my mind is one of the strong reasons why well-to-do farmer folks are pretty clear thinkers, as a class.

As one of the older sons went with me up to the quiet chamber, we stopped a minute at the door of the boys' room, and there the young fellows were buried in woolen blankets, sleeping so bully, with the big windows wide open, allowing for absolutely free circulation of the fresh night air. They had a rule that they should take turns building the fire and shutting the windows in the morning, and I could hear the groans the next morning of the young buck whose turn had come that extra cold morning. My room was—as were all the other rooms I saw—clean and furnished with the plainest, most substantial furnishings; in fact, useless fads were conspicuous by their absence over the entire house.

As we started for the breakfast room in the morning there were only men and boys from the front part of the house; the girls all coming in with the mother from the kitchen, where each had done her part in the preparation of the plain, substantial meal, the cooking of which reflected great credit upon the chief cook and her able assistants.

I had thought to speak of the well cared for lawn; the fine strawberry patch, from which one of the small girls told me they sold enough to pay for all the material used in making the girls' summer gowns; the fine sheep; the great bunch of hogs fattening for market; the carload of steers just being started on full feed; the six splendid Jersey cows that paid the grocery bill of the family; the big tool house full of the best machinery; the comfortable cattle sheds, and the good fences. But my space will not permit of this, and anyway these are the things you would expect to find outside, to match conditions inside the home. What I do want to speak of, though, is the "money crop" of this farm: two thousand bushels of sweet corn for seed, the money from which was not to be touched for farm expenses, but was to go to make the first payment on the adjoining farm that had just been purchased. The oldest son told me of this, and when I looked at him and winked, he nodded his head and blushed.

### Increasing Corn Yield Per Acre.

G. M. GARREN.

*The average yield of corn in North Carolina ought to be at least just three times what it is.* This proposition can be proved by figures and figures never lie. According to the Bureau of Statistics the farmers of North Carolina in 1910 averaged 18.6 bushels of corn per acre. That same year 364 boys of the Boys' Corn Clubs reported with an average yield of 58.7 bushels, *more than three times as much.*

According to the same source of information in 1911 the farmers averaged 18.4 bushels. Two hundred and ninety-four boys reported an average of 67.69 bushels. *More than three times as much.*

Next year, 1912, the farmers averaged 18.2 bushels. Six hundred and thirty-five boys average 62.8. *More than three times as much.*

In 1913 the farmers averaged 20 bushels. Six hundred and seventy boys reported an average yield of 62.4 bushels. *More than three times as much.* "Figures never lie."

Some of the phenomenal yields made by the boys make thought-provoking reading. In 1910 ten of the boys averaged over 130 bushels. Instead of ten one-acre fields, make it one ten-acre field. Ten acres averaging 130 bushels to the acre makes a 1,300 bushel corn crop. "Much heap big corn" from a little land. Five of them averaged 140 bushels. A five-acre field—700 bushels of corn—who can beat it? This is an average of more than seven times that of the general farmer. Next year three averaged over 150 bushels. A three-acre field—450 bushels of corn. It would require almost 25 acres of the average farmer's land to produce as much corn. Which had you rather

cultivate for the same amount of corn, 3 acres or 25? In 1912 five of the boys averaged over 150 bushels. This is 750 bushels of corn from a five-acre field. Two of them averaged over 175 bushels. Two acres of land—350 bushels of corn. A woman can cultivate that much land. This is great encouragement to the small farmer with only a few acres of land. These yields show that it is possible for him to make more corn on his few acres than the large farmer is making on his many, and with much less labor.

In this connection let it be noted that the largest corn grower among the boys in all this Boys' Corn Club movement, judged by the number of bushels grown on his acre, is a North Carolina boy. He is not receiving in the current agricultural literature credit for this, but he raised the corn just the same. In 1910 Jerry Moore, of Winona, S. C., raised 228.75 bushels of corn on one acre of land, and became the champion boy corn-grower of the whole country. His glory was of short duration. In 1911 Chas. J. Parker, Jr., of Menola, N. C., raised 235.5 bushels on one acre. This yield has not yet been exceeded. In 1913 Walker Lee Dunson, of Alexander City, Ala., raised 232.7 bushels; but this lacks 2.8 bushels of equaling Parker's yield. All these boys grew their corn under the direction of the Boys' Corn Club management; and all the corn was measured by the same rules and under the same restrictions.

These regulations require that the measuring be done by disinterested witnesses of no kinship. When Charles Parker sent in his report, the yield was so large those in charge feared a mistake had been made. So by preconcerted arrangements Mr. O. B. Martin, in charge of the Boys' Corn Club work in the South; Mr. I. O. Schaub, in charge of the boys work in North Carolina; T. Frank Parker and T. J. W. Broome, of the North Carolina Department of Agriculture; T. E. Browne, district farm demonstration agent, and E. N. Clark, land and industrial agent of the Atlantic Coast Line Railway, met at the home of young Parker, remeasured his land, gathered up all the scrap corn on the acre, reweighed the whole pile, and found he had 235.5 bushels. None of the other boys' corn was weighed by so competent disinterested witnesses.

Why is young Parker not given the credit of the championship? Samples of his corn were taken to the laboratory of the State Chemist and dried to 12.21 per cent of moisture, the moisture content of crib dry corn. By this test young Parker had 195.87 bushels. This test was not applied to the corn of any of the other boys. By it Parker lost 16.82 per cent of his corn. This much was only water. Assuming the moisture content of the other boys' corn was the same as that of Chas. Parker's, then by this test Jerry Moore had only 190.28 bushels instead of 228.75. Dunson had only 193.56 instead of 232.7. Because of this extra test doubtless explains why Chas. J. Parker, Jr., has never been accorded the honor so justly due him of being the champion boy corn grower of the South. In the popular mind his yield was 195.87, and not the 235.5 that he must be credited with to put him on an equal footing with the other boys.

Parker grew his corn at a cost of 24 cents a bushel; Jerry Moore at a cost of 42 cents; Dunson at a cost of 20 cents (19.9). Dunson has the championship for low cost of production; Parker for number of bushels grown on one acre. Jerry Moore lost the championship in 1911.

Another thing brought out in this work of the boys is the great productive power of North Carolina land when properly manipulated. Young Parker the first year made only 67.5 bushels on his acre of land. The next year his brother made 126.5 bushels on the same acre. The third year he made his wonderful yield on that same acre. In 1913 Geo. West, Jr., of Lenoir County, made 184 bushels on one acre of land, at a cost of only 19 cents, and won the State-wide prize. He had been improving this land just three years. At the beginning, in his judgment, it would not have produced over 25 bushels.

The State's improved lands do not suffer in comparison with the naturally richer lands of other States. Iowa is the greatest corn-growing State in the Union. In her Boys' Corn Club contest in 1912 the highest yield was 141 bushels; the second 131; the third 128; the fourth 123. In North Carolina that year the highest yield was 188; the second 184; the third 173; the fourth 162. A difference between the two highest yields of 47 bushels in favor of

North Carolina. The difference between the sums of these four highest yields is 184 bushels in favor of North Carolina.

The reports for 1914 are not yet out. In the agricultural papers it is reported that the highest yield in the Boys' Corn Club contest in Ohio is 143 bushels. Durham County has a boy who made 160.17 bushels in favor of Durham County. Durham has beat the big State of Ohio. All honor to Durham County.

Any farmer in North Carolina who cultivates an acre of land in corn and in a normal season makes less than 60 bushels, ought to resign his job, get his knitting and seek employment as a stenographer.

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### How We May Increase Our Yields of Wheat.

M. J. HENDRICKS.

North Carolina is not considered a wheat growing State; more than one-half of the State grows little if any wheat at all, yet we do grow a considerable number of acres of wheat, especially in Piedmont North Carolina.

The acreage sown in wheat in 1913 was 605,000. The number of bushels produced was 7,078,000, making the average yield per acre 11.7 bushels. The average price paid for wheat in North Carolina is about \$1.00. This would make our 1913 crop of wheat worth \$7,078,000. It is true that this is a vast sum of money, but when we consider the cost of production and the average yield per acre, we find that it is not a profitable crop.

The Indiana Experiment Station has figured out that it cost \$12.33 to produce an acre of wheat. If this is an accurate statement you can see at once that we are growing wheat at a loss. Twenty years ago the average yield of wheat in the United States was 12.7 bushels per acre. Today our average yield per acre is only 14.7 bushels. We have made some increase in yields, but it has been very slow. Ten years ago North Carolina made an average of 8.5 bushels per acre; now we make 11.7 bushels per acre. Some of our farmers this year have demonstrated that we can grow profitable yields of wheat. On the Holt farm in Davidson County, with a yield of 3,300 bushels, the average for the entire crop was 40.5 bushels; on 22½ acres of the same crop the average was 44.5 bushels. A farmer in Rowan County made 168 bushels on three acres, an average of 56 bushels; while another in Montgomery County made 210 bushels on six acres, an average of 35 bushels.

I would like to impress this fact: on each of these farms mentioned above they have, without a single exception, been growing clover and have supplied the land with plant food and organic matter.

Now, as wheat has become a fixed crop in our rotation, I shall endeavor to offer some suggestions as to how we might increase our yields.

First. By thorough preparation of the seed-bed, sufficient amount of plant food and vegetable matter; the time of preparation and necessary implements to do the work are some of the essentials to greater production.

If we follow a clover sod with wheat or follow corn that has been grown after a clover sod with wheat, it almost guarantees a good yield. If you intend to prepare clovered land for wheat, the results would be far better if you would not take off the first crop of clover unless your land has been brought up until it could afford to do without it. By taking off the first crop and waiting for the second crop to mature it makes it rather late to plow the land. Clover sod (or any land you expect to plow for wheat) should be plowed as early in July as possible, after the sod has matured. Give the land frequent workings up to time of sowing; the disc and section harrow are the best implements to use for these cultivations. Weeds and grass should not be allowed to grow on the land after it has been plowed, as it furnishes a breeding place for the fly and also takes plant food from the land in growing them. It does not require as deep plowing for wheat as it does for corn, say from five to seven inches. If you expect to follow peas or corn with wheat, the best and cheapest preparation is to thoroughly disc the land, that is, if the corn has had clean cultivation. The discing in of the pea vines after they have been rolled or planked down is better than turning them under.



If we expect to get the work done at the right time we *must* have the necessary implements, viz.: a disc plow, in order that we may plow our land in extremely dry seasons; a disc harrow, a section harrow, roller (that we may pulverize the clods), and a wheat drill.

Second. *We must rotate our crops.* We cannot maintain the fertility of our soil and keep up the humus supply without a system of rotation; neither can we increase our yields without a strict rotation. I shall not attempt to offer any fixed rotation, for every man should work this out for himself. He should be governed by local conditions and the crops he grows, but I will say that any system that does not include a legume is *not* a good system.

A rotation of grain crops is but little better than no rotation. A neighbor of mine sowed the same piece of land in wheat four years in succession. I will give you the result of each year's crop: First year's yield, 33 bushels; second, 22 bushels; third, 12 bushels, and fourth, 7 bushels. Each crop had the same treatment and same fertilization, and the decrease in yield was due solely to continuous cropping with the same thing.

Third. By intelligent use of plant food. I believe we can use fertilizer and make a profit by its use, but we should buy it for the analysis it contains and *not* the brand on the sack. There is no fixed formula that we can recommend for wheat on all kinds of soil. We must be governed by the previous crop, kind of soil, etc. We should also know how much of the different plant foods a given number of bushels of wheat takes from the soil, say 50 or 100 bushels, and supply the plant food in the same proportion. Phosphorus is the principal plant food needed in most of our red soils. If you have been growing peas and clover, you will not likely need any nitrogen. On sandy soil you would need to use some potash also.

Fourth. By sowing good seed, that is, seed that has been well graded and is free from filth. By the use of a grader you can in a few years eliminate all filth. There are several different graders on the market the price of which is within reach of the average farmer. Five or six farmers if conveniently located can coöperate in buying a grader, also drills, etc.

As to time of sowing, it is best to have a killing frost before we begin. Usually it is safe to begin after the 15th of October. The amount of grain to sow per acre will depend on the land, say from 1 to 1 1-2 bushels.

Fifth. Be sure to eradicate all smut, as this will decrease your yield and render the wheat less valuable. You can do this by the formalin treatment. You can get instructions as to its use from the State and United States Bulletins.

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### Silage Crops for the South.

R. S. CURTIS.

Ordinarily any crop placed in the silo would be enhanced in value for live stock either through the succulence which it would retain or the saving through the silo of the finer and more palatable parts of the feed. It is usually either necessary or desirable, however, to supplement silage with dry roughages. Owing to this fact the uncertainty of siloing certain crops, and the adaptability of these crops for supplementary purposes, a better balanced and more palatable ration can usually be obtained than were all converted into silage.

Experience has shown that corn, sorghum, kafir corn, and the grass crops make better silage than the legumes, although cowpeas make a very good quality of silage, especially when mixed with corn. The cowpea should not be siloed alone. Most legumes when siloed alone undergo a change which makes a bad discoloration and usually an inferior, unpalatable silage. Clover and alfalfa are especially undesirable for the purpose because of these changes.

Generally speaking the legumes and hollow stemmed crops such as oats, rye or timothy are not adapted to silage production owing to the difficulty of excluding the air. While these crops are not entirely barred for silage uses, it is seldom that they are so used. If finely cut and mixed with the crops better adapted to silage purposes, they may be used at times advantageously.

However, unless a crop can be siloed and preserved with a reasonable degree of certainty, it is better to cure it under ordinary air dry conditions.

A number of experiments and observations have been made to determine the keeping qualities and feeding value of various green plants. With very few exceptions the list of crops which can be successfully preserved or which increases in value by siloing is surprisingly small compared with the varied number of farm crops produced for feeding purposes. This may seem unfortunate, but considering the wide adaptability of corn, except in droughty sections where sorghum and kafir corn are successfully used, it is not so considered. It is not as necessary to perfect a method of siloing all crops as it is to have one succulent feed to administer with other dry roughages not successfully siloed. Live stock relish green, succulent feeds, but all can not be fed in this condition. It would neither be economy nor wise from the standpoint of the health of the animal.

The general introduction of silage in the ration for farm live stock is universally recognized as an important factor by those capable of judging the comparative merits of feeding stuffs for various farm animals. While the practice of siloing crops is not as widespread as it should be, marked evidences of its value among the better educated farmers will materially stimulate the use of some crops prepared in the form of silage. Corn is used for this purpose more largely than any other crop, although under certain climatic and soil conditions other crops are recognized to be of greater importance. Wherever corn is successfully grown this crop takes the lead in silage production. The reasons are threefold: First, a corn crop is palatable to live stock at most any stage or normal growing condition. Second, an acre of corn is easy to harvest, and it will go farther as a feed in the form of silage than when in any other condition. Third, no other crop will make as large a yield of silage per acre as will a corn crop, with the possible exception of sorghum or kafir corn. These facts are substantiated by experiments and the practical experience of live stock farmers. Where other crops have been tried it is usually the result of using for silage a crop which is better adapted to soil or climatic conditions, therefore furnishing a more dependable crop for silage producing purposes.

The following extract from a letter written by Mr. W. F. Ward, of the Bureau of Animal Industry, Washington, D. C., gives the consensus of opinion of silage users throughout the South:

"Corn has proved to be the best crop for silage throughout the Southern States. Sorghum has been used to a certain extent, and has proved to be very desirable for silage, although the feeding value is not as great as that of corn silage. I prefer corn silage with some sorghum mixed with it to straight corn silage, as cattle seem to relish it more. About two-thirds corn and one-third sorghum makes exceedingly good silage. If sorghum is used, the corn can be allowed to get a little more mature before being cut than if the corn is put up alone. In Southern Texas sorghum is quite generally grown for silage, and is planted early in the spring. By so doing they get two crops of sorghum a year for the silo. In Florida and extreme Southern Mississippi Japanese sugar cane has been used very satisfactorily as a silage crop. This year the Enoch Lumber Co., of Fernwood, Miss., has filled twenty silos with various crops, such as corn, sorghum, Japanese sugar cane, mixed sorghum and corn, velvet beans, soy beans and various mixtures of these crops. It will be interesting to note how the cattle relish the various kinds of silage. In Central Texas kafir corn and milo maize are quite generally used as silage crops, and have proved very satisfactory indeed for this purpose."

This information in general furnishes what we must accept as very reasonable proof of the value of various crops for silage uses. In the South corn is becoming an important crop, and with the increase of its growth it will no doubt grow in popularity for silage production purposes.

The main essentials of siloing a crop are, first, keeping qualities; second, palatability; third, quantity; fourth, distribution of the crop for feeding purposes throughout the year; and fifth, cost of preparation and converting into silage. The latter item is one of the chief objections to such crops as soy beans, cowpeas or velvet beans. Aside from their uncertain keeping qualities, they are more expensive to silo than either corn, sorghum or kafir corn.

This is an important consideration in preparing silage. The only objection to corn for silage is its low protein content. This can be overcome, however, by feeding legumes in connection with it. Some advise the mixing of clovers, cowpeas or alfalfa with the corn when siloing it, but this is not advisable if these feeds can be satisfactorily cured in any other way.

The variety of corn for silage is a matter of soil and climatic conditions. Any good corn produced for the dry corn will make a good silage crop. For beef cattle feeding purposes the writer is strongly in favor of a well eared variety to balance the one-sided nature of cottonseed meal. This in conjunction with the succulence gives the South a ration which it is difficult to duplicate from an economical standpoint.

The sorghum crops are of special importance in the West and South where the rainfall is light or irregular. Both saccharine and non-saccharine sorghums may be made into silage. Their superiority to corn as drought resistant crops makes them more dependable, both in yield and quality. The Kansas Station reports that if sorghums are harvested at the proper maturity, when the seed has hardened, they will make silage less acid and more palatable than that made from corn. Experiments show that there is little difference in the feeding values of these two silages. Mixtures of corn and sorghum have been generally satisfactory. Usually they are mixed half and half by running first a load of corn and then a load of sorghum through the cutter. It has been found that corn too dry for making good silage can be materially improved by adding a little sorghum because of the juice which it contains.

Kafir corn is a drought resistant crop, and in this respect is like the sorghum in substituting corn. It yields about the same amount of silage per acre as sorghum, and like sorghum should be mature before being put into the silo. It was found at the Kansas station that kafir corn ranks next to corn silage as a milk producer. This crop is more largely used in the dry sections of Texas where it makes a good substitute for corn. Some sections of the South are no doubt adapted to a crop with these characteristics. In Texas and Western Kansas the cheapest and most practical manner of storing kafir corn is in the silo. When so preserved the shrinkage is small, and there is no loss from the weather or otherwise unless improperly put in the silo.

Sudan grass has not been tested as a silage crop, although, judging from its palatability and succulence, it would prove excellent for the purpose. A mixture of it with the legume crops would apparently be excellent. Its use as a silage crop, however, will probably be limited, owing to the large yields, the ease of curing the grass and the small amount of waste in feeding it. This latter factor, in conjunction with the preservation of the succulence, is the main reason for siloing a crop. Crops which are otherwise palatable and useful in the dry condition are of greater service in stock feeding than when siloed. This argument applies directly to the clovers and grass crops. The crop which makes the largest yield and retains its succulence and palatability is the crop best adapted to siloing purposes. There seems to be no all-round substitute for corn excepting, perhaps, the sorghums and kafir corns, which can be used either alone or in a mixture.

The practice of storing dry fodder corn in the silo is deserving of consideration in the South. In the West this practice is followed with good results. The green corn is first placed in the silo in the fall, and after this is fed out the dry corn fodder is cut and run into the silo with liberal quantities of water. While the quality and feeding value of corn prepared in this way is not equal to that of regular corn silage, it is much more palatable than the dry corn, and there is considerably less waste in feeding it.

The discussion on silage crops for the South to the writer is not as much a problem of determining the crops best adapted as it is in getting larger quantities of corn silage used on live stock farms, principally those producing beef and dairy cattle. The incentives which are now being offered for corn growing will bring this crop into greater prominence as a silage crop. While the South has drawbacks in curing the leguminous hays and other crops now produced, it is believed that better methods of curing in the air-dry condition will render them of greater service than in the silo. Unless silage undergoes a normal fermentation it becomes a dangerous feed for stock. As before

stated, the hollow stemmed plants and legumes do not make the same quality of feed as corn or allied plants or as they do when cured as hay. Taken as a whole, corn, sorghum, kafir corn, with possible mixtures of these and other crops at times, possibly the legumes, seem to be the wisest course to follow. There may be objections or criticisms to these statements, but it is believed in general they summarize the silage crop problem for the South.

In general, what would be obtained from a crop cured as hay would be true on a comparative basis when it was prepared as silage. Judging from this the increase in value as a silage crop would in general be in direct proportion to that of other crops.

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## Feeding Dairy Cattle.

R. L. SLOAN.

### BODY MAINTENANCE.

The body of any living organism, whether animal or plant, requires food and drink for its maintenance. Withhold drink from a plant or tree during its active growing period and it will wither the first day. Cease to water and feed your cow or any other animal, man included, and the result will inevitably terminate in death. Such is the penalty nature has fixed for disobedience of her laws and from which there is no appeal.

In nature's laboratory, the body of the animal now under discussion, there is a constant need for new food material to furnish fuel for heat and energy which characterize the living from the dead. Just as water possesses power for turning a water wheel but once, and the supply must be continuous in order to keep the wheel turning, so the food consumed by an animal is soon spent, and to keep the forces of life in motion a new supply must be forthcoming.

This food, after being taken into the body and undergoing digestion, is transformed by some magic power incomprehensible to scientists into sensitive living tissue. This transformation of inert material into living, as do all the other processes of life, calls for the expenditure of energy and heat, which can only be obtained from assimilated food. A part of the energy value of food is consumed chewing, swallowing and digesting that which is eaten, for no organ of the body can be induced to work without pay. The heart must receive pay in advance through energy stored from food previously eaten for every beat which sends the life-sustaining blood into all parts of the body. Likewise the contracting muscles which keep us involuntarily breathing day and night must burn their midnight oil collected from food stored away in the body. The temperature of the blood must be maintained about the same throughout the year (98.6 F. in man) regardless of atmospheric conditions. Add to all of this the energy required for tissue repair when injured, for growth and reproduction. Now if work is to be performed or milk produced or fat added, an additional amount of food must be supplied after providing for all of the above.

Plants take the elements and simple compounds and combine them into substances which we have learned to call carbohydrates, fat, and protein. These same compounds when eaten by an animal, after being taken into its body, are separated, transported and rearranged according to the function of the animal, thus completing another span in the transformation of erstwhile inert matter.

Each class of compounds has a duty to perform in moulding the life of the animal. Protein is necessary to the normal development of the framework—bone, muscle, nerve, blood, hair, hoof and hide. Carbohydrates enter into tissue formation, and greatest of all they form, when burned, the basis of heat and energy for carrying on the work of the body. Fat is a reserve supply of heat and energy stored away, for economy of space, in a more concentrated form than carbohydrates, to be drawn on as needed. If for any reason the fat is withheld from the feed of the animal enough of this compound may be manufactured from protein and carbohydrates to sustain life, or even to add fat to the body. Should the carbohydrates be deficient in the ration energy heat may be obtained to carry on the processes of life from

the protein and fat, provided, of course, these elements are supplied in sufficient quantities. But if protein is withheld there is nothing to take its place—the animal dies. Or if there is some in the feed but the amount is insufficient while the animal is young the result is a stunted growth and poorly developed animal for life. The explanation of this is that carbohydrates are made up of carbon, hydrogen and oxygen. Fat is also made up of carbon, hydrogen and oxygen, but relatively much more carbon. Protein is made up of nitrogen and sulphur in addition to carbon, hydrogen and oxygen. While the latter three elements are found in all three compounds, and are more or less interchangeable from one to another, nitrogen is only found in the one, and being so essential to life, it must be supplied.

#### FUNCTION AND FEED OF THE DAIRY COW.

The function of a dairy cow is to convert the energy found in rough feeds into a form at once palatable and digestible to animals that otherwise could not use this energy. In this respect she is like a machine. The coarse, unwieldy product is fed to the cow machine to be manufactured into milk. After exacting her toll for body maintenance and work of changing feed to milk, according to Jordan, about twenty-six per cent of the digestible energy in the feed is returned in milk. He bases his calculations on a typical 870-pound dairy cow producing 20 pounds of milk from 15.5 pounds of digestible feed, with an abundance of water. This factor, however, is exceedingly variable, even aside from digestibility.

A prime requisite for a maximum milk flow is that the cow be full. To this end a bountiful supply of relatively cheap feed should be supplied from forage crops. Chief among the sources for supplying this cheap bulky feed is the corn plant where silos are available for preserving the cut stalks. Silage is preëminently the filler for the spacious stomach of dairy cattle. Corn for silage should not be cut until after the shuck turns brown and the kernels begin to glaze. However it is generally found to be good practice to supplement silage with a small allowance of a good legume hay or, in the absence of this, corn stover or non-leguminous hay may be substituted. There are so many farmers owning only one or two cows who cannot afford a silo that some other roughage must be provided. For North Carolina, cowpea and soy bean hay easily take first rank. The clovers and oats and vetch are also popular feeds. In too many instances cows in this State are forced to subsist, and expected to produce milk, on corn shucks and corn tops, or wheat or oat straw, along with a small allowance of cottonseed meal and hulls.

Thirty pounds of silage and ten pounds of a good hay, along with a reasonable allowance of grain, is about all that the average grade dairy cow in this State can be induced to eat. However, in the economical management of a dairy herd, the aim of the feeder should be to furnish the cows with all the so-called roughage they will consume without leaving any.

Where pasturage is available through the summer months the feeding problem is greatly simplified. Large dairies are usually located near cities where land is so valuable that the owner finds it more profitable to devote his limited acreage to silage corn production than to pasture. There are many dairymen, however, who depend largely on pasture crops for spring and summer feeding, and who improve their pasture land.

In addition to the specially prepared permanent pasture of mixed grasses and clovers, an abundance of rye is sown in the fall for early spring grazing, and the residue turned into the land for soil improvement. Farmers keeping only a few cows for family use generally have either a permanent unimproved pasture or grazing land from which the animals are expected to draw the greater part of their living through the spring and summer months. Exceptional cases are known to the writer where cows have produced a good flow of milk from pasture alone, receiving no grain ration whatever.

Soiling is but little practiced in this State. It has generally proven uneconomic and unsatisfactory to be forced to gather feed every day regardless of weather conditions or other factors. There are a few who still practice this method in a limited way and find it profitable, but this is rarely if ever the case where a silo exists.

For a succulent feed in the fall and winter on farms where there is no

silos, root crops fill the need admirably. Large yields can be secured of beets, rutabagas, turnips and related crops, all of which make good cow feed when either run through a feed cutter or chopped up by hand enough to prevent the cows from choking on them.

To produce a large amount of rich milk requires usually more nutrients than the cow is able to get from coarse or succulent forage and ordinary pastures. According to the Wolff-Lehmann standard for a 1,000-pound cow yielding 22 pounds of milk daily, an allowance of 29 pounds of dry matter, 2.5 pounds of digestible protein, 13 pounds of digestible carbohydrates, and .5 pound of digestible fat should be daily provided. This ration has a much larger proportion of protein than one recommended for fattening cattle. The nutritive ratio between protein and the energy producers is here 1 to 5.7. Henry's ideal ration for supplying this feed consists of 40 pounds of silage, 15 pounds of clover hay, 3 pounds of ground corn, and 1 pound of cottonseed meal. Here most of the nutrients come from inexpensive but desirable home grown roughage, requiring only four pounds of concentrates to balance the ration.

For North Carolina there is no better carrier of protein than cottonseed meal to be added to the dairy ration. Though dangerous when fed to calves and pigs, or even to cattle in unlimited quantities, there is not only no danger when fed to grown cattle in quantities less than six pounds per animal a day, but for economy, palatability and convenience it is unsurpassed. Rarely is it necessary or good economy, however, to feed more than four pounds of cottonseed meal a day. Linseed meal, Gluten meal, and dried distillers' grains are other feeds shipped into the State for their high protein content.

Dried beet pulp is growing in popular favor among dairymen throughout the State. It invariably increases the milk flow immediately upon being added to the ration, and an appreciable decrease is as quickly noticed on withdrawing it from the ration. This is a feed rich in carbohydrates, poor in protein, and containing no fat. Its cost, owing to scarcity and long distance to factories, renders its use almost prohibitive except under special conditions.

Perhaps the next most popular feed in the State after cottonseed meal is wheat bran. These two at present prices form the basis of nearly all mixtures of concentrates, the bran having a decided lightening effect on the meal. A mixture of equal parts of cottonseed meal, wheat bran, dried distillers' grain and dried beet pulp has given excellent results in the dairy at the North Carolina A. and M. College. For a heavy milker getting rather thin, two to four pounds of corn meal is added to the daily ration until normal flesh is regained.

There is a tendency among dairymen to feed more concentrates or grain than is profitable. The desire seems to be a maximum flow of milk regardless of cost or economy. The fact is where Herd Testing Associations have not been formed the owner experiences difficulty in separating the robber cows from the profitable ones, nor has he generally taken into consideration the cost of production. The simplest rule that can be given is to feed all the roughage the animal will consume and not more than one pound of grain for three pounds of milk produced.

#### ENVIRONMENT.

The dairy cow responds to kindness. Good feed and good housing may be more than offset by having a dog drive the herd up in the evenings. Unnecessary noise in the barn at milking time may so excite a cow as to materially affect her milk secretion, for, contrary to popular belief, cow's milk is elaborated from the circulatory system largely during the process of milking.

Though other classes of stock, including dry cattle, may stand exposure without apparent injury, such is not the case with milk cows. A severe wind will reduce the milk flow quicker than almost anything else. Good, comfortable quarters are therefore necessary during severe weather in winter for a paying business. Otherwise too much of the feed is consumed in maintaining the normal body temperature.

On account of the large stomach of the cow, feeding oftener than twice a

day is unnecessary. Regularity, however, should be rigidly observed. Feeding at four o'clock one day and seven the next tends to keep the cow unsettled and nervous. And the order of feeding grain and roughage should be constant too.

Owing to the fact that 87 per cent of milk is water, the cows should have free access to plenty of clean water. Salt should be supplied daily in the feed or else kept constantly in the feed lot in the form of rock-salt, both for the health of the animal and for an inducement to drink more water.

#### SUMMARY.

Nature requires of all animals that nutrients be consumed for body maintenance, growth and reproduction. This toll must be exacted and other feed added before we should expect milk to be produced or other work performed.

Different classes of nutrients are required for different functions, and in general protein is required for frame-work, in growth and repair, and in work, with a considerable amount consumed in milk production. While carbohydrates and fats are more or less interchangeable in function, the ultimate end of both is to produce energy. Large amounts are also used in milk production.

The dairy cow is a machine for converting coarse feed into milk. Cheap feed in the form of forage plants should be supplied in abundance, and ordinarily not more than one pound of an expensive grain ration should be fed for each three pounds of milk produced.

Environment should not be overlooked in the feeding barn. Reasonable quiet should be observed. The dairy cow should not be exposed to severe weather conditions. Regularity is essential to good feeding. Plenty water and salt should be provided.

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### Hog Raising Versus Hog Cholera.

DR. F. D. OWEN, U. S. DEPARTMENT OF AGRICULTURE.

There can be no doubt that the present European war has worked vast financial injury to the Southern cotton planter this year. Also there can be no doubt that it contains a valuable lesson, in once more showing the fallacy of the one-crop method of farming, and it has helped to bring into the foreground the adaptability of North Carolina as a stock-raising State, and the need of developing that industry upon our farms.

For several reasons North Carolina enjoys unique advantages which should put her among the first States in the live stock industry, not the least of which is the climate she enjoys, and which permits of pasturing nearly the year around, and her nearness to a ready market for all such products that can be grown. And it is generally conceded that the animal which gives the quickest returns is the hog.

Statistics show us that North Carolina has but 1,335,000 hogs, which is equivalent to only 4.7 hogs per farm. Also it is shown that this State imports from the Northern and Western States annually more than six and one-half millions of dollars worth of cured meats, besides the fresh meats which are brought in; and as cured meats generally mean pork in one of its various forms, it can be readily seen how good a market there is right here at home, in addition to the live stock markets of Richmond, Baltimore, and other cities.

But in order to obtain the full measure of profit to be derived from the hog raising industry, there are a number of items which must be thoroughly understood, among which may be mentioned better housing, better pastures, better feeding, and more attention to the animals generally, for a crop of hogs is not going to be successful and make money for the owner if it is not carefully watched and taken care of, any more than a farmer could expect to make a good crop of cotton or tobacco by simply putting the seed into the ground and then come back several months later to harvest the crop. But the thing above all else to be considered is hog cholera, the greatest of all scourges to the hog raiser.

Hog cholera is an acute, highly contagious disease, affecting hogs only, and is characterized by a very high death rate (85 per cent); loss of appetite, rapid emaciation or loss of flesh in those animals which do not die within the first week or so of the disease, and the rapidity with which the disease is spread through a neighborhood.

The first reported outbreak of the disease in the United States was in Ohio in 1833, and from that first invasion it has spread until there is not a State or section of this country in which hogs are grown that have not felt the ravages of this disease. It seems to go in epidemics, or waves, over the country, and appears to usually start in the South and East, which can be readily understood to be due to the milder climate and longer period of warm weather. The first serious epidemic passed over this country in the years of 1886-87, and the mortality reached 134 hogs out of every 1,000. For the next few years the mortality subsided until in 1896-97 a second epidemic gathered force and at its climax killed 144 hogs out of each 1,000 in the country, or nearly 14.5 per cent of all the hogs in the United States. Following this outbreak the mortality again declined, going to as low as 45 per 1,000, but in 1911 it again started to climb and reached 89 per 1,000 in that year, and in 1913 had gone to 107 per 1,000.

In 1913 the total number of swine in the United States was given at 61,178,000, and out of that total there were 6,738,283 hogs which died from cholera. North Carolina last year had 1,335,000 hogs and lost 69,687 from the disease, valued at upwards of three-quarters of a million dollars. Thus we see that we are dealing with a disease which, unless controlled, will keep on causing immense financial losses to the farmers who devote their efforts to the raising of swine.

The symptoms of the disease will usually develop in from five to fifteen days after the animal has been exposed to the contagion, the average period being about nine days. And usually the first thing the owner will notice will be that the animals are not eating as they should; they will appear listless, ears and tail droop, and back arched. He may at first be constipated, and will probably later develop diarrhœa; there is usually a discharge from the eyes which at times is profuse enough to cause the lids to gum together. His skin, especially upon his abdomen from the chest to the thighs, will assume a reddish discoloration, and if his temperature is taken it will be found to be much higher than normal, which is from 101.5 to 102. These and other manifestations will prevail for from a couple of days to as long as ten or twelve days, when the animal usually succumbs.

However if the virulence of the virus, or causative agent, is low, or if the resistance of the animal is high, he may linger on for from a couple of weeks to a month or more, and then it has assumed the chronic type of disease. In these cases the animal will gradually wither away until he is scarcely more than an animated skeleton, and it would be much better if such cases were destroyed at once for it will take months of patient feeding and nourishing to bring him back to thriftiness, and all the time he is sick he is a constant source of danger to other animals in spreading the disease about the neighborhood, or maintaining the causative agent upon the farm where he is confined.

The disease presents a train of symptoms which are far from constant, and so also is the picture a sick animal presents after death. If one were to be slaughtered while at the height of the disease and an examination made one would first look for the reddened skin. The next portion of the body to be examined would be the lymphatic glands or "kernels" of the neck, and which in cholera become enlarged and reddened. After this the lungs would claim attention, they showing numerous blood spots over their surface which cannot be washed off with water, thus showing them to be underneath the pleura covering the lungs. The stomach would next be examined, and upon its inner side, in a case of cholera, we find the lining to have become covered with small red spots very often. From the stomach we next look at the inner side of the intestine, especially at that point where the small intestine joins the large. Here we look for the typical "button ulcer" of hog cholera, and which may be in size from a pea to as large as a twenty-five-cent piece, and which presents a black, raised surface above the surrounding parts, and has a yellow center. These ulcers are usually found in the chronic



type of cholera and are considered to be diagnostic of the disease. Probably one of the most important places to look for disease is in the kidney, where we look for a change that has given to it the name of "turkey egg kidney," from its resemblance to this egg. The organ becomes spotted with little hemorrhages which are in size from a pin point to as large as a pea, and lay underneath the capsule of the organ. The bladder should also be examined for changes there, the appearance being little hemorrhages scattered over its inner surface, showing the rupture of minute capillary vessels.

As noted above, not all of these changes may be expected in any one carcass, but the presence of any of them, taken in consideration with the fact that the disease seems to spread with such rapidity, will indicate cholera.

The United States Department of Agriculture, through the Bureau of Animal Industry, has been endeavoring for years to control this disease; as long ago as 1878 Congress appropriated \$10,000 and caused a commission of nine men to be appointed to study the disease and ascertain if there was any remedy for it. They worked faithfully and in 1905, Dr. M. Dorsett and Dr. W. B. Niles, with others, produced what has become known as the Dorsett-Niles method of immunization against hog cholera.

It is unnecessary to go into the technical details of how this serum is produced, but it can be stated that before it was recommended to be generally used it was tested upon large numbers of animals, both in the laboratory and in the field upon farms and under ordinary farm conditions and found to be wholly dependable if used in accordance with the very simple directions.

After the method of serum immunization had been perfected to a point where it could be entrusted to the general public, a meeting was called of the officials of the various states and among those which responded was North Carolina; and the results were that a plant to manufacture serum and sell it to the farmers at cost has been established and has been the means of saving many hogs for this state. This serum can be obtained by application to the State Veterinarian, Raleigh, N. C.

There are two methods of using this serum; one is designated as the Serum Alone Method, and consists of injecting a proper amount of the serum into the muscular tissues of the animal to be treated and will result in giving an immunity which will last for from six to eight weeks. This is ample time for an owner to clean up his premises and remove the danger; or he can fatten his hogs in that time and slaughter them or send them to market. This method can be administered by any one and if the ordinary sanitary precautions are observed good results will follow.

The other method consists of injecting a proper amount of serum into one side of the body, and into the other side the injection of a very small and carefully regulated dose of the actual diseased blood obtained from a hog that was slaughtered during the last stages of the disease, and which will result in an immunity of much longer duration, from several months in pigs to practically a life immunity in older swine. But as can be readily seen, this method has to be handled with extreme precautions, and so the State Department of Agriculture has ruled that no one but a competent Veterinarian, or a man who has been specially trained in the handling of this virus shall be permitted to administer the "Serum Simultaneous" method of immunization.

These methods of serum immunization are of great value in helping to save the swine North Carolina now has, but in order to control the disease and to finally eradicate it, we must use something more than serum, and the following "DOES" and "DONTs" will epitomize the most needful things that should be done by the farmer when the disease gets a foothold in his neighborhood or in his herd.

**"IF YOU HAVE CHOLERA UPON YOUR FARM"****"DO"**

Notify your neighbors that they may protect themselves.  
Post notices of infection upon your gate posts to protect others.  
Notify the State Veterinarian that he may help you control the disease.  
Burn all dead carcasses and stop the spread of the disease.  
Disinfect, remove, and immunize all your well hogs.

**"DON'T"**

Allow sick dogs to run at large; it is against the State laws.  
Don't allow strangers to go into your hog lots.  
Don't neglect to clean up your farm after an outbreak of cholera.  
Don't allow buzzards to hover over or alight upon your farm.  
Don't add new hogs to your herd without quarantining them for 30 days.  
Don't allow your hogs access to streams and overflows.

And if we can have the help of every one to this extent, the losses from hog cholera can be greatly cut down, and a final eradication of the disease can be hoped for.

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**Controlling of Crop Diseases.**

HARRY C. YOUNG.

It has always been exceedingly difficult to present the subject of plant diseases to farmers. It is a proposition that must come to them from scientists, must be handled by scientists through the coöperation with the crop growers. A farmer is almost helpless before a serious attack of any plant disease and as these diseases work on the plants in a similar manner that diseases work on animals, it seems that his first duty is to consult or depend upon a specialist to solve his problems. The state has in its employment men for this work and all the crop growers need to do is to let their wants be known. How many farmers through lack of knowledge of what plant diseases are and how they work, lose a part or all of their crop which might have been saved had the disease been recognized. The sooner farmers realize that plant diseases exist and are increasing in number, the better plant diseases will be controlled. In the majority of cases the son follows out the ideas of his father. When we talk plant diseases to him he says: "My father could raise good crops and fruit and never heard of plant diseases, why should I spend time and money trying to eradicate something that I scarcely believe exists." He forgets he is living in a different age than that of his father. Diseases have become much more general in recent years, especially since our modern methods of rapid transportation. Our desire for new and imported varieties of seed helps to increase the spread of plant disease. We can notice though that most of the farmers who are making money today use every available means for crop protection. But the sad fact is, the majority of the farmers of North Carolina are not making enough money, the cause of which is largely due to the lack of dependence in experts that are hired to help them, but instead clinging to the ideas of their fathers. To give you some idea of how much the farmers depend upon the specialists secured to help them I wish to cite the following example: In many sections of the state the growers of leguminous crops have been noticing a sort of damping off or wilt in some of their clover fields. This is caused by a fungous disease that is brought into every community along with the clover seed. The fungus forms its spores in small groups surrounded by a heavy wall so that the small body of spores resembles very closely a clover seed. These bodies are sown in the field along with the clover seed and the result is you have introduced a disease that is likely to stay with you as long as you try to grow clover. These little bodies known as sclerotia can only be recognized by specialists. In order to check the present outbreak the State Plant Pathologist sent out a request for every farmer to send in a

sample of seed that he might determine whether they were suitable for sowing or not. The result was that only one man sent a sample of his clover seed in to be tested. This fall thousands of acres were planted with spores which will be ready to cause the disease next spring, all of which could have been prevented.

Nearly all diseases of the more important crops can be prevented by using a small amount of time and money and a little thought. Take, for instance, the oat smut. The oat crop of North Carolina is diminished from 10 to 40 per cent annually by this disease alone. The cost of producing oats under ordinary conditions is about \$9.00 per acre. At the average selling price it would take 22.5 bushels to break even. The average yield for North Carolina is about 20 bushels. Thus you can see the average farmer is growing oats at a loss, not saying anything about the large number who are producing less than the average. Ordinarily, when preventive measures have been taken the crop yield was increased 20 per cent. This increase of 20 per cent over 20 bushels would bring the average yield up to 25 bushels per acre. At this rate the farmer would not only raise oats at cost but would realize a net profit of two and one-half bushels per acre. Oat smut, as a rule, can be almost entirely controlled by treating the seed with formalin in the following way. One pint of formaldehyde to thirty gallons of water will make a solution sufficiently strong to kill all smut spores. There are two ways of applying the formaldehyde solution. The first, and a little the cheapest, is by spraying the seed. The grain should be spread out rather thinly over a smooth surface, such as a barn floor, canvas, or hard ground. The mixture should be sprinkled thoroughly over the grain. Then mix the grain well and heap in a pile. Cover the pile with old carpets, canvas or anything that will prevent the fumes from escaping. The fumes from the formaldehyde are as deadly as the solution itself. Leave the seed covered about six hours and then dry. In the second method the grain is immersed. This can be done by dipping a sack of oats into a barrel containing the same strength of solution as used in the former method. The sack should be left in the barrel about ten minutes. Then drain and put the wet sacks of grain in a pile and cover as in the first method. It should be left covered about two hours. The seeds should then be dried and sown. Formaldehyde costs about thirty cents a pint and one pint will be sufficient to treat 30 bushels of grain. It only takes a thinking man to see that this is a good plan to increase his oat crop at least one-third.

The average yield of cotton is diminished from 10 to 40 per cent by plant diseases. The one causing the greatest amount of loss is anthracnose or boll rot. The spores of cotton anthracnose are disseminated largely through the seed. They can live in the seed at least three years and it is unwise to plant seed after they have attained that age. The spores will remain in the old stems and bolls for twelve months. Therefore, in controlling the disease, there are two important measures. First, practice at least a two year crop rotation. Second, select uninfected seed. Seed should be selected at picking time from bolls that show no signs of infection of any sort. The boll should be large and contain characters needed in improving the variety. The cotton picked in this way should be ginned after all other ginning is done and the gin disinfected. If it is too much trouble to select cotton seed for the entire field, a small amount may be selected and used for starting a seed plot. The proper selection of seed not only controls the anthracnose but improves the variety year by year. No man can afford to raise cotton and not follow out the two methods mentioned above.

Corn suffers less from diseases than does any other crop. Corn smut probably lowers the yield of corn more than any other disease. The only control measures for corn smut are crop rotation and field sanitation. Keep the smutted stalks and ears from getting into the manure. Seed selection always improves corn, yet a very small amount of smut can be gotten rid of in this way.

The potato crop often suffers from diseases that are largely preventable. Probably the most serious disease of the Irish potato, especially in the western part of the state, is the late blight or downy mildew (*Phytophthora infestans*). The disease appears late in July. It affects the stems, leaves, and tubers. Protective spraying with bordeaux mixture will entirely control the

disease. The first spray should be applied when the potato plant is about six inches tall. Three thorough applications should be given during the months of July, August, and September. A 5-5-50 solution of bordeaux should be used. This means 5 pounds of lime, 5 pounds of bluestone and 50 gallons of water. Bordeaux mixture is prepared as follows: Dissolve 5 pounds of bluestone in 25 gallons of water. The bluestone will dissolve more rapidly if it is suspended near the upper surface of the water. Slake 5 pounds of lime in a small amount of water. After the lime is well slaked add enough water to the paste to make a volume of 25 gallons. Put the two solutions together and you have prepared the best fungicide known. When bordeaux mixture is used for spraying fruit it should be made of 4 pounds of lime, 4 pounds of bluestone, and 50 gallons of water. Bluestone can be bought at any drug store for 8 cents per pound. Bordeaux mixture can be bought already prepared for application.

Almost all diseases of farm crops can be controlled by the following methods of farm practice:

First. Keep the plant in a good healthy growing condition. This can be done by having a good seed-bed made by deep fall or early winter plowing. The land plowed at this time will tend to conserve the moisture that falls during the winter and spring.

Second. Practice a two or three year crop rotation.

Third. Select the best of seed from good uninfected plants.

Fourth. Treat seed with a disinfectant when selection is impossible, such as oats, wheat, and potatoes.

Fifth. Practice field sanitation.

The question of time always comes up in regard to attending to some of these small jobs on the farm. It is true that a farmer is kept busy almost all the time, but it would be far more profitable to him if he had less land and smaller fields. In looking after the smaller things he could make his little fields bring larger returns than the man across the fence who is still trying to farm the whole plantation.

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## LEAF TOBACCO SALES FOR NOVEMBER, 1914.

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Pounds sold for producers.....	37,996,472
Pounds sold for dealers.....	3,957,917
Pounds sold for warehouses.....	2,252,435
Total.....	44,206,824

**THE BULLETIN**  
**OF THE**  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE**  
**RALEIGH**

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Vol. 36, No. 2.

FEBRUARY, 1915.

Whole No. 206. ✓

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**REPORT**  
**ON THE**  
**PIEDMONT SOILS**

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS

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‡In coöperation with Bureau of Plant Industry, United States Department of Agriculture.

HON. W. A. GRAHAM, *Commissioner of Agriculture.*

SIR:—I submit herewith the manuscript of a report bearing on an investigation of the soils of the Piedmont Section of the State. In the May, 1911, Bulletin of the Department will be found a similar report for the soils occurring in the mountains. The work as carried out has included, (1) a survey or mapping of the soils to show the location and extent of the different types; (2) the analyses of the soils to determine the amount of their important plant food constituents; and (3) the conduct on the different soils of field experiments to ascertain the fertilizer requirements for most profitable crops and their improvement, and the crops to which they were best adapted.

A similar report is being prepared for the eastern soils. More data is available for this and the eastern report than was for the mountain soils. A general or more comprehensive report of the work on all the soils in the State will follow in due time.

Acknowledgment is given for making the analyses of the soils to J. K. Plummer, W. G. Haywood, J. M. Pickel, W. H. Strowd, J. Q. Jackson and others in the chemical laboratory of the State Chemist; for a large part of the labor required in the preparation of the soil maps to W. E. Hearn, L. L. Brinkley, F. P. Drane, S. O. Perkins, R. B. Hardison, R. B. Derrick and R. C. Journey; for writing the description of the soils for this report to W. E. Hearn; for aiding in conducting the field work to E. L. Worthen, W. F. Pate, F. N. McDowell, F. T. Meacham, A. R. Russell, E. C. Blair and the owners of the outlying experimental fields; and for early efforts in connection with the inauguration of the work and for kindly interest and aid throughout its progress to Director B. W. Kilgore.

I recommend the publication of this as the March BULLETIN.

Respectfully,

C. B. WILLIAMS,  
*Chief, Division of Agronomy.*

Approved for printing:

W. A. GRAHAM, *Commissioner.*





# A REPORT ON THE PIEDMONT SOILS, PARTICULARLY WITH REFERENCE TO THEIR NATURE, PLANT FOOD REQUIRE- MENTS AND ADAPTABILITY TO DIFFERENT CROPS.

By C. B. WILLIAMS, W. E. HEARN, W. F. PATE and J. K. PLUMMER.

## SUMMARY.

In this report is given what has been done during the past fourteen years in a systematic study of the soils of the Piedmont Section of the State, with a view to ascertaining what the different Piedmont soils are, where they are located, their extent, the amount of different plant food constituents which they contain, their fertilizer needs for most profitable crops and for permanent improvement, and the crops to which they are best adapted.

A clear description is given of each kind or type of soil so that the farmer will know that he is operating on that particular kind of soil or soils. As far as the work has progressed maps are available showing the location and extent of the different type soils.

A rather large number of analyses have been made of the various types of soils in different parts of the Piedmont section. These analyses show the total amount of the more important plant food constituents in these soils. While there is considerable variation, all the Piedmont soils have been found to be fairly high in potash, low in phosphoric acid, and to contain a fair amount of lime. The amount of nitrogen is usually very small but varies with the quantity of vegetable or organic matter in the soil. In most of the Piedmont soils there is sufficient potash in the surface soil to produce maximum crops for a hundred years or more, while twenty to twenty-five such crops would entirely exhaust the phosphoric acid. The experiments conducted at the Central, Iredell, Monroe, Gastonia, and Charlotte fields No. 1 and No. 2 agree in showing that as a general thing crops like corn, cotton and wheat are not generally benefited by applications of potash, but that phosphoric acid first and nitrogen second, except with the Iredell loam where it is first, are the controlling constituents in increasing yields. In the use of fertilizers for the production of profitable crops or for the improvement of the soil, liberal applications of phosphates must be made, and nitrogen must also be supplied either in fertilizers or from soil-improving crops.

Lime has not materially increased the yields of cereals and seed cotton, but has seemed to prove beneficial in most cases with the legumes grown on soils of this section to which lime has not been added in recent years.

The soil analyses and field experiments point the way to the proper use of fertilizer on these soils and to their improvement. Phosphates must be used liberally and nitrogen, either in fertilizers or as soil-improving crops, or both, must be used with phosphates. How to

supply the phosphates most economically and to furnish the nitrogen in soil-improving crops or in fertilizers is discussed in the report. Other reports will follow from time to time giving results of field experiments now in progress and outlined in this report, as well as additional analyses of soils, as the work in surveying and mapping the soils of the section progresses.

#### WHAT HAS BEEN DONE.

In the spring of 1900, a systematic study of the soils of the State was begun by the State Department of Agriculture. The methods used in the investigations are along three distinct lines as follows:

1. A soil survey of each of the counties of the State is being made as rapidly as possible showing the location, extent and boundaries of each of the different types of soil occurring in the different counties. This division of the work is being carried on in coöperation with the Federal Bureau of Soils.

2. Samples of the various types of soil found in each county are carefully taken for chemical and mechanical analyses in order to determine the amounts of the different plant food materials present and the physical make-up of each type of soil.

3. Experimental farms and fields have been established on the more important soils, where the chief crops of each section are grown in a rational system of rotation under field condition with different fertilizer applications. By this system of plat experimentation, it is hoped to determine the best methods of crop rotation and the most profitable fertilization for each type of soil and at the same time gradually build up the productivity of the soil.

A detailed soil survey of counties partially or wholly in the Piedmont Region of the State has included all of Alamance, Cabarrus, Caswell, Gaston, Granville, Mecklenburg, Johnston, Forsyth, Rowan, Union, Lincoln, Randolph and Wake, and parts of Catawba, Burke, Caldwell, Alexander, Iredell, and Davie.

This report deals largely with the chemical composition of the more important soils of the Piedmont section of the State and the results secured in fertilizer plat experiments.

#### LOCATION AND EXTENT.

That part of North Carolina widely known as the Piedmont region, embraces a wide belt running in a northeast and southwest direction across the central part of the State. It includes about 38 per cent of the area of the State, or 11,814,700 acres of land. It lies between the flat and gently rolling Coastal Plain Region on the east, and the high, rugged, but beautiful mountain ridges on the west. The Piedmont Plateau merges into the mountains so gradually in many places, that it is difficult to draw any sharp division between them. However, the division line marking the Piedmont from the mountains passes through Surry, Wilkes, Caldwell, Burke, McDowell, Rutherford and Polk counties as they form the foothills. The line of separation between the Piedmont and Coastal Plain regions runs through Anson, Richmond, Montgomery, Moore, Lee, Chatham, Wake, Johnston, Nash, Halifax, and Northampton counties.

In addition to the border line counties, the Piedmont region includes all of Warren, Vance, Granville, Person, Caswell, Rockingham, Stokes, Yadkin, Forsyth, Guilford, Alamance, Orange, Durham, Randolph, Davidson, Rowan, Davie, Iredell, Alexander, Catawba, Lincoln, Cleveland, Gaston, Mecklenburg, Cabarrus, Union and Stanly.

#### GENERAL TOPOGRAPHY AND DRAINAGE.

The prevailing surface features or topography of the Piedmont region is that of a high plateau which has been dissected by numerous streams and now presents a dominantly rolling and uneven surface. Upon some of the broader divides, and interstream areas the surface is undulating to gently rolling, becoming rolling and hilly as the streams are approached. Gullied and eroded areas are common, particularly near many of the larger streams. There are also areas of level to undulating land, occupying a low or basin position with reference to the surrounding soils. This character of topography is particularly distinctive of a part of the Iredell, Mecklenburg, and Granville soils. In isolated spots throughout the Piedmont region there are conspicuous hills, ridges, and low mountains rising several hundred feet above the general level of the uplands. The most noticeable of these occur in Gaston, Burke, Alexander, Wilkes, Iredell, Randolph and Stokes counties.

Bordering the Coastal Plain on the east, the Piedmont region has an elevation above sea level of about 300 to 400 feet, this gradually rising to the west until it attains an elevation approximately of 1,000 to 1,200 feet, where it commonly merges into the mountains. The general slope of the Piedmont region, as evidenced by the stream courses, is to the southeast. The rivers, larger creeks, and streams have carved out rather deep, but usually, narrow valleys, and in these some flat and level areas of bottom land are seen in contrast to the general rolling character of the country. With the exception of a few local areas, the soils of the Piedmont region have excellent natural surface drainage, in fact, the rainfall runs off the hillsides so rapidly that erosion is very pronounced in many places and terracing has been resorted to as an essential means of preventing the cultivated fields from gulying and washing. The drainage of this region is effected through Roanoke, Tar, Neuse, Haw, Cape Fear, Yadkin, Pee Dee, and Catawba rivers, and their numerous tributaries which ramify the uplands, forming an intricate net-work of creeks, branches, and streamlets. All of the region is adequately watered.

#### CLIMATE.

The climate of the Piedmont region of North Carolina is fairly mild and equable, being suitable for the growing of a large variety of farm crops. An examination of the data given in the appended table as taken from the Weather Bureau records at Raleigh, Charlotte, Statesville, and Roxboro, will reveal the fact that the rainfall is ample and well distributed throughout the year. The temperature seldom reaches 100 degrees F, or drops below zero. The spring and fall months are almost ideal for farm work, while the summers are not excessively hot nor the

winters extremely cold. A considerable amount of farm work can be carried on during the winter months and early spring, as there are a number of pretty days during that time.

The eastern and southern parts of the Piedmont region as shown by the table at Raleigh and Charlotte are slightly warmer than the northern and western portions around Roxboro and Statesville. This is accounted for in part because of the differences in elevation. The average date of the last killing frost in the spring at Charlotte is April 1, and the first in the fall is November 4. This gives a growing season of about 215 days—a sufficiently long time for the production of a wide range of crops. Of course along the northern and western border the growing season would be a few days shorter.

Owing to its high elevation, rolling topography, and good surface drainage, and also to the fact that good spring and well water can be had in all parts, the Piedmont region possesses a healthful and invigorating climate.

The following table gives the average precipitation and temperature at several points in this region, extending over a period of several years.

#### MEAN NORMAL MONTHLY AND ANNUAL TEMPERATURE AND PRECIPITATION.

TEMPERATURE—DEGREES.													
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avr.
Raleigh.....	41	43	50	58	68	76	79	77	71	60	51	43	60
Charlotte.....	41	44	51	59	69	76	79	77	72	61	51	43	60
Statesville.....	36	40	46	57	65	73	77	76	68	56	50	36	56
Roxboro.....	37	38	50	57	67	74	78	76	70	58	49	40	58
Average.....	39	41	49	58	67	75	78	76	70	59	50	40	58
PRECIPITATION—INCHES.													
Raleigh.....	3.6	4.4	4.3	3.6	5.1	4.6	6.3	5.8	3.2	3.8	2.3	2.9	49.9
Charlotte.....	4.3	4.6	4.8	3.4	3.9	4.6	5.3	5.2	3.3	3.4	3.0	3.8	49.6
Statesville.....	4.7	4.5	5.3	3.2	5.2	4.6	5.4	5.6	2.6	3.6	2.8	3.7	51.6
Roxboro.....	3.1	4.6	4.1	3.7	5.1	3.5	5.6	4.0	3.8	3.4	2.6	3.1	46.6
Average.....	3.9	4.5	4.6	3.5	4.8	4.3	5.6	5.1	3.2	3.5	2.7	3.4	49.4

#### AGRICULTURE AND INDUSTRIES.

The Piedmont region of North Carolina has a population according to the United States census for 1910, of over 1,000,000 people, or nearly one-half of the 2,200,000 people in the State. This region now (1914) probably has a population around 1,100,000. This region includes many of the large cities in the State such as, Charlotte, Raleigh, Winston-Salem, Greensboro, and Durham, and a considerable number of large and important towns, such as, High Point, Salisbury, Concord, Gastonia, Shelby, Hickory, Statesville, Reidsville, Oxford, Henderson, Burlington, Monroe, and Lexington. All of these towns and many

smaller places are important markets for the products of the Piedmont region, as well as for the products from the other sections of the State.

This particular region embraces a preponderance of all manufacturing industries within the State. Perhaps 200 cotton mills are situated in this belt, Gaston County alone having more than 60 of these within its borders. High Point is one of the largest furniture manufacturing towns in the United States, while considerable furniture is also manufactured at Lexington and other places. Durham and Winston-Salem are known the world around for the manufacture of cigarettes, smoking, and plug tobacco. Charlotte is situated in the center of probably the best electrical power development in the United States. Many cotton mills and other manufactories are operated by electricity, as well as the lighting of a majority of the towns.

The Piedmont region is favored in most parts with excellent railroad transportation facilities, fairly good roads, and other conveniences. The idea and importance of good public roads is being fostered throughout the State. This region is more thickly settled than any other section in North Carolina, due in a large measure to the general rolling nature of the country, and its excellent drainage conditions as contrasted with a considerable portion of the flat, swampy lands of the east, and the rugged character of much of the mountain areas to the west. The farms as a rule are small; that is, ranging from 50 to 300 acres, with a few reaching to 1,000 or more acres in size. The large per cent of the farms are operated directly by the owners and the immediate family, together with a small amount of hired help.

The soils of the Piedmont region are adapted to a wide range of crops, such as corn, cotton, tobacco, wheat, oats, clover, rye, soy beans, cowpeas, pumpkins, sweet potatoes, sorghum, and garden vegetables. The soil is also adapted to apples, peaches, and berries. On the high, more sandy types near the cities, truck farming can be carried on profitably; while dairying and cattle raising can be extended on a much larger commercial scale. There is now one large creamery located at Hickory, and its products are distributed over North Carolina and cities outside of the State. The heavy red lands are admirably suited to clover and grasses, and excellent pastures can be maintained for grazing purposes. A few of the rougher areas can be profitably used for forestry.

The soils, generally speaking, are inherently fairly productive, some of them being rich in potash, and are susceptible to high and rather permanent improvement. The large yields of crops obtained by some of the best farmers, are true indications of what these soils are capable of producing when properly handled. Much of the scratched over, abandoned, and so-called worn out lands can easily and cheaply be reclaimed and restored to a position suitable for profitable agricultural utilization.

#### ORIGIN OF THE SOILS.

The Piedmont Plateau Region of the United States extends from the Hudson River to east-central Alabama, attaining its greatest width and being well developed in North Carolina.

The soils of the Piedmont region are all of residual origin, that is, formed through the processes of weathering and decay from the under-

lying rocks. The only exception is the small area of alluvial soils found along the streams, and here the soils are composed of fine material which has been washed down from adjoining uplands or mountain sections, carried and deposited along the streams at times of normal rainfall and freshets.

The rocks of the Piedmont region are varied and complex, including old igneous rocks, such as diorite, diabase, gabbro and granite; the metamorphosed igneous and sedimentary rocks, such as gneiss, schist and slate; and the young sedimentary rocks, such as Triassic sandstone and shales. The older rocks have been tilted and warped out of all semblance to their original position, this tilting and folding being noticeable in road cuts in many localities.

At one time there was no soil over the present Piedmont region, but the surface was composed of hard bed rocks, and the waves and tides of the waters of the Atlantic Ocean lashed the rocks along the eastern edge of this region. The disintegration and weathering of the rocks by the slow but constant action for centuries of nature's agencies of decomposition and decay, such as rain, sunshine, freezing, thawing, vegetation and the like, has gradually broken down these rocks into very small particles, which mixed with organic and vegetable matter, forms the present soils. In many places on the slopes erosion has kept such a close pace with disintegration that the rotten rock or bed rock is exposed. As a general rule, however, these rocks have weathered to a considerable depth as seen in railroad cuts and in digging wells.

The varied rocks of this region differ materially in their physical and chemical composition and their disintegration and subsequent processes of weathering have given rise to apparent differences in the resultant soils. These differences have justified the grouping of the soils into series based principally on the origin or character of rock from which derived, color, structure, and crop adaptation. There is generally a close relation between soil series and certain rock formations. The Alamance and Georgeville series are confined exclusively to the Carolina slate belt; the Iredell and Mecklenburg series to an area underlain by diorite, gabbro-diorite, and mica-diorite; the Granville and Penn series to the Triassic basin, where sandstone and shales occur. The largest and most important series in the Piedmont region is the Cecil. This series and the Durham series owe their origin mainly to granites and gneisses.

The names given to the series and types, such as Cecil, Durham, Iredell, Granville, Mecklenburg, etc., are usually the names of counties or towns where the types were first mapped and are used for purposes of identification, as being more distinctive and easier to remember than numbers.

#### CECIL SERIES.

The Cecil Series includes the most important and widely distributed soils of the Piedmont Plateau, being the dominant soils in every county, except in a few counties in the slate belt. The heavier members are known as "red-clay land," while the sandy surface areas are called "gray lands." A characteristic of the subsoil is the content of sharp quartz sand, and the frequent occurrence of veins of quartz. Mica

flakes are present in many localities. These soils are of residual origin, being derived through the processes of weathering from granite and gneiss, and locally from schists. Fragments, and boulders of the parent rock are, however, found in places on the surface. The general surface features of the Cecil soils vary from gently rolling to rolling and hilly areas, with broad level to undulating interstream, which become broken and rough as the streams are approached. Practically all of the soils possess excellent natural surface drainage, and the more rolling areas are excessively drained.

The Cecil Series is the nearest complete of any in the Piedmont region, and includes the following types thus far mapped in North Carolina: the Cecil sandy loam, clay, clay loam, fine sandy loam, coarse sandy loam, loam, stony sandy loam, gravelly loam, and stony loam.

#### CECIL SANDY LOAM.

The Cecil Sandy Loam, or "gray land" is the most extensive and widely developed soil in the series, occurring in large areas, and well distributed throughout the Piedmont region. The surface soil of this type consists of a yellowish-gray, gray, to light-brown medium, sandy loam, ranging in depth from 6 to 15 inches. The subsoil is a red, stiff clay, extending to a depth of 3 feet or more. The type includes spots of fine sandy loam and gall spots of clay or clay loam. Occasionally the surface soil is of a reddish-brown color.

The Cecil Sandy Loam is a mellow and easily tilled soil; one which invites the use of labor-saving machinery. It is the main trucking soil of the Piedmont Plateau Section in North Carolina. The more sandy areas of this type are peculiarly adapted to the production of sweet potatoes, Irish potatoes, peanuts, bright tobacco, watermelons, rye, garden vegetables, and many truck crops, while the shallower and heavier areas are well suited to the growing of cotton, corn, oats, cowpeas, sorghum, and crimson clover. The lighter and deep surface soil areas produce a fairly bright leaf tobacco, while the shallow areas grow a heavy dark leaf. It is the principal tobacco soil in many counties, particularly Forsyth.

#### AVERAGE CHEMICAL ANALYSIS OF CECIL SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.0395	.028	2.31	.159	770	546	45036	3100
Subsoil }	-----	.025	.058	1.54	.174	1982	4598	122079	13793

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	5.3	16.7	10.2	24.2	11.2	23.6	8.5
Subsoil.....	2.5	7.0	5.3	15.7	7.0	19.3	43.2

## CECIL CLAY.

The Cecil Clay is the red heavy clay land of the Piedmont Plateau. The surface soil for 4 to 6 inches is either a red clay or heavy clay loam, underlain to a depth of several feet by a red, stiff, tough clay. In a few localities the first 2 or 3 inches of the surface may be a heavy loam, while in other places the stiff raw clay has been left exposed by erosion. The Cecil clay is inherently a strong and productive soil, but it requires careful handling and the use of strong teams and machinery to properly prepare it in order for it to produce its best yields. This soil is particularly adapted to the production of wheat, oats, red clover, orchard grasses, and is one of the best soils in the State for these crops. It is also used for the growing of cotton and corn, but the bolls do not open as well as upon the sandy loam.

## AVERAGE CHEMICAL ANALYSIS OF CECIL CLAY.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to a depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
						Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.073	.063	.41	.21	1424	1229	7995	4111
Subsoil }	-----	.032	.095	.44	.14	2545	7553	35982	11133

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	1.2	3.9	4.7	11.3	7.8	20.6	50.3
Subsoil.....	1.6	2.3	2.8	6.3	6.3	20.8	59.9

## CECIL CLAY LOAM.

The Cecil Clay Loam, or commonly called "red land," is one of the largest and most important types, and will likely occur in every county in the Piedmont region of North Carolina. It really represents an intermediate grade of material between the Cecil clay and the sandy



loam and loam types. The surface soil of the predominant areas consists of a brown, reddish-brown, or red loam or clay loam, ranging in depth from 5 to 10 inches. The subsoil is a deep red, stiff, tough clay, extending to a depth of several feet. In many places the first 2 or 3 inches of the surface soil is a gray to reddish sandy or fine sandy loam, while in local spots the surface material is a red clay or clay loam, closely resembling the Cecil clay. Nearly every ten-acre field presents a spotted appearance.

The Cecil Clay loam, owing to a higher percentage of sand in the surface soil, works up to a better tilth than the Cecil Clay. The type is a strong and productive soil, being well adapted to a wide range of crops, and especially satisfactory for the production of corn, oats, wheat, cotton, red clover, vetch and cowpeas. Some heavy tobacco is grown upon the sandier areas. Irish potatoes, sweet potatoes, cabbages, sorghum, tomatoes, turnips, garden vegetables and a few apples, peaches, and grapes are successfully grown for home use and local trade.

AVERAGE CHEMICAL ANALYSIS OF CECIL CLAY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
						Nitrogen	Phosphoric acid	Potash	Lime CaO	
Surface Subsoil	2mm.	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface	}2mm. {	-----	.066	.051	.46	.234	1293	999	9014	4585
Subsoil		-----	.028	.092	.41	.223	2231	7330	32669	17769

AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	1.7	5.2	6.0	16.1	21.3	27.0	22.7
Subsoil.....	.9	2.1	2.3	5.3	8.5	32.2	49.0

CECIL FINE SANDY LOAM.

The surface soil of this type to a depth of about 6 to 12 inches, is a yellowish-gray, light-brown or reddish-brown fine, sandy loam. The subsoil is a bright-red, stiff, clay extending to a depth of 3 feet or more. Occasionally reddish-yellow streakings are noticeable in the subsoil. Usually the Cecil fine sandy loam is a mellow and easily tilled, and only in the heavier and more silty areas is there any baking or clodding. This soil is well suited to cotton, corn, wheat, oats, cowpeas, clover, and locally to sweet potatoes, sorghum, strawberries, cabbages, and Irish potatoes.

## AVERAGE CHEMICAL ANALYSIS OF CECIL FINE SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Vola- tile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface) 2mm. {	-----	.0384	.0375	1.17	.195	729	712	22207	3720
Subsoil) {	-----	.0193	.0693	1.09	.129	1522	5466	84979	10176

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	.8	5.1	10.0	30.8	28.3	19.9	5.1
Subsoil.....	.6	2.1	2.3	7.5	6.3	27.3	53.7

## CECIL COARSE SANDY LOAM.

The surface soil of this type to a depth of 6 to 12 inches consists of light-gray to reddish-brown coarse sandy loam or loamy coarse sand, containing a considerable quantity of small quartz gravel. The subsoil is a red, stiff, brittle clay, carrying a noticeable amount of coarse sharp sand. The soil is loose in structure, and is easily tilled, yet there is a sufficient amount of silt and clay present to give a loaminess in many places, thus causing the soil to bake slightly in the heavier areas. This type is well suited to cotton, corn, oats, and cowpeas, and the lighter and more sandier areas to tobacco, sweet potatoes, rye, and vegetables.

## AVERAGE CHEMICAL ANALYSIS OF CECIL COARSE SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface) 2mm. {	-----	.043	.034	2.032	.465	737	583	34828	7970
Subsoil) {	-----	.020	.060	1.710	.218	1510	4531	130139	16463

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	15.9	23.2	11.0	18.4	4.0	21.9	5.6
Subsoil.....	3.8	9.6	6.0	8.4	2.4	25.0	44.8

## CECIL LOAM.

The surface soil of the Cecil Loam to a depth of about 5 to 10 inches, consists of a yellowish-gray, light-brown to reddish-brown loam or silty loam. The subsoil, to a depth of 3 feet is a red, tough clay. Occasionally rock fragments are scattered over the surface and disseminated throughout the soil, and not infrequently outcroppings of granite are seen. Corn and cotton are the main crops grown, although some wheat, oats, potatoes, sorghum, cowpeas, and vegetables are produced. The Cecil loam is one of the small types of the series.

## AVERAGE CHEMICAL ANALYSIS OF CECIL LOAM.

					Pounds of Total Plant Food Constituents per Acre Surface Soil to a depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Vola- tile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.0475	.0855	1.164	.251	856	1541	20980	4524
Subsoil } {	-----	.0270	.0580	1.218	.143	2160	4640	97440	11440

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	3.5	5.7	5.8	15.5	17.3	37.6	14.4
Subsoil.....	.4	1.5	2.0	6.2	6.0	23.4	60.5

## CECIL STONY SANDY LOAM.

The surface soil of this type consists of a gray to light-brown, fine to medium sandy loam, varying in depth from 6 to 10 inches. The subsoil is a bright, red, stiff, brittle, clay, 3 feet or more in depth, and presenting yellowish-red mottlings in places. Angular fragments of quartz and of the parent rock are strewn upon the surface and mixed with the soil, approximating 15 to 50 per cent of the first few inches. This soil is practically as productive as the Cecil sandy loam, but owing to the content of stones, cultivation is seriously hindered, rendering the soil much less desirable. Cotton and corn are the principal crops grown.

## AVERAGE CHEMICAL ANALYSIS OF CECIL STONY SANDY LOAM.

Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.									
	Volatile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface	-----	.043	.0282	1.053	.12	789	518	19333	2203
Subsoil	-----	.0108	.0258	1.688	.18	864	2064	135040	14400

## CECIL GRAVELLY LOAM.

The Cecil Gravelly Loam to a depth of about 4 to 10 inches consists of a gray to reddish-brown loam, or fine sandy loam, containing from about 15 to 40 per cent of red, coarse, sand and fine, angular quartz gravel, locally termed "millstone grit land." The subsoil is a red, stiff, clay, carrying some angular quartz gravel. This is a small type and has only been mapped in Richmond County, but other areas will probably be found. It is used for the growing of cotton, corn, oats, and cowpeas. All crops, especially cotton, fruit well.

## AVERAGE CHEMICAL ANALYSIS OF CECIL GRAVELLY LOAM.

Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.									
	Volatile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface	-----	.026	.001	1.932	.05	353	13	26198	678
Subsoil	-----	.028	.14	1.446	.082	1830	9150	94511	5360

## CECIL STONY LOAM.

The surface soil of this type consists of yellowish-gray, gray, or brown loam or silt loam, having a depth of about 6 to 8 inches, and containing from about 20 to 50 per cent of rock fragments, usually quartz. Occasionally large bowlders of granite are seen. The subsoil is a red silty clay, or clay with a noticeable content of fine sand particles. Only small bodies of this soil have been mapped, and where the content of stone is small, corn and a few other crops can be grown. This type should be used for pasturage land or forestry.

## AVERAGE CHEMICAL ANALYSIS OF CECIL STONY LOAM.

						Pounds of Total Plant Food Constituents per Acre			
						Surface Soil to depth of 6½ inches, 2,000,000 lbs.			
						Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Vola- tile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.063	.04	1.505	.121	1028	653	24562	1975
Subsoil } {	-----	.02	.076	1.626	.254	1600	6080	130080	20320

## DURHAM SERIES.

The soils of the Durham series are prominent throughout the Piedmont region in North Carolina, and especially so in Granville, Durham, Vance, Person, Caswell, Guilford, Alamance, Davidson, Wake, Johnston, and other counties. The soils are derived from light-colored, rather coarse grained granite and gneiss, consisting principally of quartz and feldspar, with some mica. These rocks are usually of a more siliceous character and lower in iron-bearing minerals than those giving rise to the Cecil types. The topography is gently rolling to rolling, and by reason of loose texture of the soil, and the rather sandy texture of the subsoil, drainage conditions are excellent and in places even excessive. As a rule, the soils are deficient in organic matter, and require applications of manure or fertilizers in order to give good results. These soils are renowned tobacco soils of North Carolina and Virginia.

The Durham Series is represented thus far in the areas mapped by the following types: the coarse sandy loam, sandy loam, and fine sandy loam.

## DURHAM SANDY LOAM.

The surface soil of the Durham sandy loam consists of a light-gray medium sandy loam, extending to a depth of 6 to 8 inches, grading into a pale-yellow medium, sandy loam, which continues to a depth of about 15 inches. The subsoil is a yellow, sandy clay or friable clay, usually extending to a depth of 3 feet or more. In some places a few quartz gravel and angular stones are present, and also small mica scales. Occasionally the soft granitic rock comes near the surface in eroded areas. Dikes of greenish diorite rock are frequent throughout the type. This is the most widely distributed soil of the Durham series, and has been mapped in Alamance, Cabarrus, Granville, Forsyth, Mecklenburg, Johnston, and Iredell counties.

The Durham sandy loam is a mellow and easily tilled soil, and when properly handled it seldom bakes. It is particularly well adapted to the production of bright yellow tobacco, and is devoted largely, throughout the northern part of the State, to that crop. The leaf cures to an attractive color, and brings a high price on the markets. The soil is

also admirably suited to the growing of sweet potatoes, peanuts, rye; while corn, watermelons, cantaloupes, cotton, and garden vegetables are profitably produced.

#### AVERAGE CHEMICAL ANALYSIS OF DURHAM SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre			
						Surface Soil to a depth of 6½ inches,			
						2,000,000 lbs.			
						Subsoil to depth of 28 inches,			
						8,000,000 lbs.			
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.023	.016	.336	.79	434	302	6337	14899
Subsoil }	-----	.018	.019	.469	.3785	1397	1475	36202	29378

#### AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	6.3	23.7	17.1	17.4	14.0	17.9	3.8
Subsoil.....	4.6	12.4	11.2	16.7	12.1	17.7	25.5

#### DURHAM COARSE SANDY LOAM.

The surface soil of this type consists of a gray or yellowish-gray, coarse, sandy loam or loamy sand, varying in depth from 8 to 15 inches. It is commonly called gray land, and occasionally "isinglass land." The subsoil is a yellow, or pale yellow, coarse, sandy clay or friable clay, with coarse sand particles extending to a depth of 3 feet. In the lower portion of the subsoil mottlings or streakings of red are of common occurrence in many localities. In forested areas, the first few inches of the soil is dark-gray in color, due to the presence of organic matter, while in some fields which have seen many years of cultivation, the surface in places presents a whitish appearance. Angular quartz gravel are present on the surface in many localities. This soil is loose, mellow, and easily tilled, warming up easily in the spring. This type constitutes some of the best bright tobacco soil in the Piedmont region, producing a beautifully-colored leaf, which sells at good to fancy prices. The soil is also suited to the growing of rye, corn, sweet potatoes, watermelons, cantaloupes, garden vegetables, and locally to peaches.

## AVERAGE CHEMICAL ANALYSIS OF DURHAM COARSE SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.034	.044	1.602	.353	611	791	28804	6347
Subsoil }	-----	.02	.031	1.257	.2868	1490	2309	93621	21360

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	12.9	18.1	12.4	23.2	8.2	19.2	5.8
Subsoil.....	9.5	11.1	8.1	15.6	12.1	21.1	22.2

## DURHAM FINE SANDY LOAM.

The surface soil of this type consists of a gray to yellowish-gray fine sandy loam, varying in depth from about 8 to 12 inches. The subsoil is a yellow, friable, clay or fine, sandy clay, which shows mottlings of red in the lower portion of the 3-foot section on the better drained areas, and gray mottlings in the poorly drained situations. This type has a very small development, and has been mapped only in Granville county. The soil is better suited to general farm crops, and is a stronger soil than the coarse or medium sandy loam, but not so well adapted to bright tobacco. It is used for tobacco, corn, oats, wheat, clover, cowpeas, and sweet potatoes.

## AVERAGE CHEMICAL ANALYSIS OF DURHAM FINE SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.046	.070	.251	.100	862	1312	4704	1874
Subsoil }	-----	.023	.031	.517	.071	1715	2311	38548	5294

## IREDELL SERIES.

The soils of the Iredell Series are distributed to a more or less extent throughout the Piedmont region. These soils are locally called "black-jack oak," "bees wax," or "pipe clay" lands, because of the waxy, sticky, and putty-like character of the subsoil material. They are derived through the process of weathering from diorite, hornblende schist, and chloritic rocks. The topography varies from flat to rolling. The impervious character of the subsoil in the flatter areas causes rather poor surface drainage, while the underdrainage of all the types is hindered considerably by this clay which prevents a free downward movement of the rain water. The lighter surface soil areas and more rolling bodies possess fairly good drainage conditions.

The Iredell series is represented by 5 types; the stony loam, sandy loam, fine sandy loam, loam and clay loam.

## IREDELL SANDY LOAM.

The surface soil of the Iredell Sandy Loam consists of a gray, brownish-gray or dull brown medium to fine sandy loam, having a depth of 6 to 10 inches. The subsoil is a yellowish, light brown, or dull brown, sticky, impervious clay, which at about 24 to 30 inches grades into the rotten, greenish, diorite rock. A few small iron pebbles are of frequent occurrence in this soil, and scattered over the surface. This is a large and important type in Caswell County; also areas of it have been mapped in Randolph County. It is best suited to corn, oats, wheat and grasses. In a few localities, upon the more sandy areas, higher and better drained bodies, tobacco can be successfully grown; also sweet potatoes.

## AVERAGE CHEMICAL ANALYSIS OF IREDELL SANDY LOAM.

	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Pounds of Total Plant Food Constituents per Acre			
						Surface Soil to depth of 6½ inches, 2,000,000 lbs.			
						Subsoil to depth of 28 inches, 8,000,000 lbs.			
						Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface		.037	.015	.12	1.45	704	285	2283	27558
Subsoil) 2mm. {		.0225	.039	.099	1.61	1800	3120	7920	128800

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	3.4	8.7	7.8	27.5	15.7	30.1	6.9
Subsoil.....	.1	1.5	1.7	7.1	9.2	22.4	58.1



## IREDELL FINE SANDY LOAM.

The surface soil of this type consists of a gray to grayish-brown, fine to medium sandy loam, varying in depth from 5 to 10 inches. The subsoil is a yellow to brownish, impervious waxy, sticky clay, being very plastic when wet, and cracking open when dry. The subsoil seldom extends below 24 or 30 inches, grading at this depth into the rotten rock. Small, rounded, iron pebbles or concretions, and occasionally boulders are scattered over the surface. This type includes spots of Durham fine sandy loam and Cecil fine sandy loam. This type has been mapped in Granville, Cabarrus, and Mecklenburg counties. The soil is used mainly for corn, oats, cotton, and the lighter areas for tobacco, sweet potatoes, sorghum, garden vegetables, but is best suited to small grains and pasturage.

## AVERAGE CHEMICAL ANALYSIS OF IREDELL FINE SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to a depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.0495	.048	.22	2.30	892	865	3964	41446
Subsoil } {	-----	.036	.0598	.20	2.33	2822	4688	15680	182672

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	5.1	8.8	8.7	23.7	21.0	20.0	12.6
Subsoil.....	.6	1.7	1.7	6.1	14.3	32.2	43.6

## IREDELL LOAM.

The surface soil consists of a dark gray, to a dull brown loam, silty loam, or fine sandy loam, with a depth of 4 to 8 inches. The subsoil is a yellowish to brown, generally yellowish-brown or greenish-brown, waxy, sticky clay, extending to a depth of 20 to 36 inches. Frequently at 24 to 30 inches it grades into a soft, rotten rock. Subsoil, on exposure to weathering, changes to a dull brown. Small, rounded, iron concretions over a large part of this type are mapped in Cabarrus, Granville, Mecklenburg, Randolph and Richmond counties. Until recently the Irede!! loam was considered as a poor soil for general farming, but now it is highly prized. It is well adapted to corn, oats, wheat, and grasses. Oats seem to do better than any other crop. Cowpeas, Johnson grass, and lespedeza do well. Grasses make an excellent

growth, and afford a good pasturage for sheep and cattle. Cotton has a tendency to rust, and corn to "french," but kainit, in a large measure, counteracts these conditions. Excellent yields are being obtained from this type in Mecklenburg and other counties where the soil is properly handled.

AVERAGE CHEMICAL ANALYSIS OF IREDELL LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 23 inches, 8,000,000 lbs.			
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.054	.17	.29	2.25	903	2840	4849	37620
Subsoil } {	-----	.033	.076	.236	2.67	2624	6044	18767	212318

AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	6.3	9.0	4.9	21.0	29.0	18.5	10.9
Subsoil.....	3.2	4.5	3.3	10.5	12.1	22.5	44.0
Lower subsoil (decomposed rock).....	5.0	13.5	11.2	25.3	14.7	10.7	19.2

IREDELL STONY LOAM.

The surface soil of this type, to a depth of about 6 to 12 inches, consists of a gray to brownish-gray or dull brown loam, silty loam or fine sandy loam. The subsoil is a dull, yellow, or yellowish-brown waxy, impervious clay, passing at a depth of about 20 to 30 inches into a soft rotten rock, mainly diorite. The surface is literally covered with fragments of diorite and blue to gray slate. Owing to unevenness of its surface features, and the presence of rock fragments, practically none of it is cultivated. Only a few patches of it are used for the growing of corn and other crops. It is best suited to forestry, although spots of it can be used for pasturage or the production of corn.

## AVERAGE CHEMICAL ANALYSIS OF IREDELL STONY LOAM.

					Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface} 2mm. {	-----	.093	.086	.223	5.625	606	561	1454	36675
Subsoil} {	-----	.035	.067	.335	3.890	1840	3522	17608	20453

## IREDELL CLAY LOAM.

The surface soil of this type consists of a dark gray, dark brown to almost black heavy clay, containing a high percentage of small rounded iron pebbles or concretions, and having a depth of 4 to 8 inches. The subsoil is a yellowish-brown to greenish-brown, plastic, sticky, heavy clay, which at about 24 inches passes into the partially decomposed rock. It is the heaviest type in the series so far encountered. Where the subsoil comes near the surface, cultivation is difficult. Owing to the impervious character of both the soil and the subsoil, it is restricted as to its crop adaptation. The soil is suited, however, to both wild and cultivated grasses, which can be used advantageously for grazing of sheep and cattle. Wheat, oats, and corn also, can be successfully grown under proper treatment.

## AVERAGE CHEMICAL ANALYSIS OF IREDELL CLAY LOAM.

					Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface} 2mm. {	-----	.079	.051	.647	3.503	1509	974	12353	66907
Subsoil} {	-----	.045	.036	.206	4.168	3442	2753	15755	318669

## ALAMANCE SERIES.

The soils of the Alamance Series constitute a large part of the land in Union, Stanly, Montgomery, and Randolph counties, and are well developed in Cabarrus, Davidson, Anson, Moore, Rowan, Chatham, Granville, and spots in a few other counties in that general region. These soils have been derived from the "Carolina slate"<sup>1</sup> formation,

<sup>1</sup> See Bulletin 21 N. C. Geological and Economic Survey.

which forms a large belt in that part of the State. These slates are usually fine-grained, being either massive or breaking up into thin flakes. The surface features of this belt vary from gently rolling to rolling, and in places, steeply rolling to hilly. The Alamance series differs from the Georgeville mainly in the color of soil and subsoil, and also in agricultural value.

Only two types have been mapped in the Alamance series: the Alamance silt loam and the slate loam.

#### ALAMANCE SILT LOAM.

The surface soil of the Alamance silt loam to a depth of 2 to 3 inches consists of a light gray to almost white silt loam, passing gradually into a yellowish-gray or yellow silt loam which extends to a depth of 6 to 10 inches. The uniformly mellow, smooth, silty texture of this soil together with its whitish surface, gives it somewhat the appearance of flour, and for this reason, it is locally called "white floury land." The subsoil of the typical areas is a yellow silt loam to silty clay, which in the lower portion of the 3 foot section presents a reddish cast, or shews mottlings of red. Occasionally in the flatter and poorer drained areas the subsoil is a pale, yellow, silty, clay mottled with gray and white. However, all variations in color, from a beautiful yellow to light red, may be seen in the subsoil. This type is so closely associated with the Georgeville silt loam, that in many places it contains spots of the latter. Frequently on the small ridges or knolls, the surface has a considerable sprinkling of white quartz rocks, and in many places slate fragments are of frequent occurrence.

The Alamance silt loam is one of the largest and most important soils in the south central part of the State, or in the slate belt. In its natural condition, it is not highly productive, but when supplied with vegetable matter, limed and fertilized, it is adapted to corn, oats, wheat, rye, clover, grasses and cowpeas, and in the southern counties to cotton.

Sweet potatoes, Irish potatoes, sorghum and garden vegetables do well, and these together with a few apples, peaches and pears are grown for home, and to a limited extent for local markets.

#### AVERAGE CHEMICAL ANALYSIS OF ALAMANCE SILT LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to a depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.			
						Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm { Subsoil }	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO				
	-----	.039	.051	.602	.311	704	921	10872	5616
	-----	.038	.076	1.007	.179	2897	5794	76293	13647

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	1.4	2.4	1.4	2.0	2.2	78.9	11.1
Subsoil.....	.4	1.3	.8	1.3	.5	69.8	25.6

## ALAMANCE SLATE LOAM.

The fine material of the surface soil of this type consists of a gray to nearly white silt loam, ranging in depth from 6 to 8 inches. It is estimated that from 25 to 50 per cent of bluish to gray slate fragments, usually angular and oblong, and varying in length from one-half an inch to several inches, are scattered throughout the soil. Numerous outcrops of slate rock are encountered, and these obstruct plowing. Sometimes between 8 and 15 inches a yellow silty clay is encountered, but frequently the rotten slate or solid bed slate comes within 8 inches of the surface, and is always found at a depth not greater than 15 or 20 inches. The slaty fragments are a nuisance and interfere with cultivation. Some few spots where not too slaty, are devoted to the growing of corn, wheat, oats and cotton. This is a small and unimportant type, and it should be used for forestry purposes.

## GEORGEVILLE SERIES.

The soils of the Georgeville Series, like the Alamance, are derived from the "slates" of the Carolina slate belt. It is believed that the rocks of this group giving rise to the Georgeville series are higher in content of iron-bearing minerals than those giving rise to the Alamance. The topography varies from undulating to rolling or broken along the stream courses. The natural surface drainage is good, and even excessive on the more rolling areas. The Georgeville soils are somewhat stronger agricultural soils than the corresponding members of the Alamance Series. The Georgeville Soils occur in close association with the Alamance soils and are well developed in Union, Stanly, Montgomery, Randolph, Cabarrus, Anson, Richmond, Granville, and places in Moore and Davidson, and Chatham and Rowan counties.

The Georgeville Series is represented thus far in the areas surveyed, by two types; the Georgeville silt loam and Georgeville silty clay loam.

## GEORGEVILLE SILT LOAM.

The surface soil of the Georgeville silt loam consists of gray, pale red or red silt loam, which usually passes into a yellowish-red or red silt loam at about 3 to 6 inches. The subsoil of the typically developed areas beginning at about 5 to 12 inches to a dull red, bright red or pinkish-red brittle silty clay, extending to a depth of 3 feet or more. The surface soil has a smooth, mellow feel, and works up to a good tilth. Frequently on the steeper slopes, the surface soil has been washed off, leaving exposed the red silty clay. This type also includes many spots

of Alamance silt loam and Georgeville clay loam. It is one of the large and important type occurring within the slate belt.

The Georgeville silt loam has been mapped in Cabarrus, Granville, Richmond, and Randolph counties, and will be encountered in other counties of the slate belt. It is perhaps the most desirable soil in the region in which it occurs. It is susceptible of a higher state of improvement than the Alamance soils. It is well adapted to corn, wheat, oats, clover, grasses and in the southern counties of the State, to cotton. Cabbage, sorghum cane, Irish potatoes, and garden vegetables, together with apples, peaches and pears, are successfully grown for home use.

#### AVERAGE CHEMICAL ANALYSIS OF GEORGEVILLE SILT LOAM.

						Pounds of Total Plant Food Constituents per Acre			
						Surface Soil to depth of 6½ inches, 2,000,000 lbs.			
						Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface	-----	.037	.073	1.62	.165	447	881	19557	1992
Subsoil	-----	.026	.090	2.031	.100	1928	6674	150619	7416

#### AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	3.0	6.2	2.9	3.4	1.7	63.9	18.4
Subsoil.....	.6	3.1	1.7	1.7	.3	61.6	30.5

#### GEORGEVILLE SILTY CLAY LOAM.

The surface soil of the Georgeville silty clay loam to a depth of 5 to 8 inches consists of a reddish-brown to red silty clay loam or heavy silt loam. The subsoil is a deep red, stiff but fairly brittle silty clay to a depth of several feet. In a few localities the first 2 or 3 inches may be a gray silty loam, which passes gradually into the red heavy silty loam or silty clay.

The Georgeville clay loam is the heaviest member of the series, and constitutes the red heavy land of the slate belt. Its development, however, is confined to small restricted areas. The soil is particularly well suited to the production of corn, wheat, oats, and clover, and is utilized mainly for these crops.

#### GRANVILLE SERIES.

The Granville Series of soils are developed in restricted areas along the eastern border of the Piedmont Region in the State. The largest occurrence of these is confined to Granville, Durham, Wake, Chatham,

and Lee counties, while Anson, Richmond, Union, Orange, and other counties have representative bodies. In color and other physical characteristics these soils are quite similar to the Durham types, but the subsoils are slightly more plastic and somewhat heavier, being of a smoother texture, and possessing a slightly greasy feel. The deep subsoil or substratum of the Granville differs from that of the Durham in having a variegated color, which is frequently formed of Indian red, greenish-gray, purplish drab, and white. The Granville Series is derived from the Triassic sandstones and shales. It is possible that the lighter color as compared with the Penn soils, which are also derived from Triassic sandstone, is due to leaching processes. The topography varies from gently rolling to slightly hilly and near the stream courses broken and hilly, and the drainage is splendid.

The Granville series embraces the following soil types: the coarse sandy loam, fine sandy loam, and gravelly loam.

#### GRANVILLE COARSE SANDY LOAM.

The surface soil of this type consists of a gray to almost white, coarse, sandy, loam or loamy sand, which at about 4 or 6 inches grades into a yellowish, coarse, sandy loam. The subsoil, beginning anywhere between 10 and 20 inches, is a yellow clay, rather smooth and somewhat plastic. On the lower portion of the 3-foot section an Indian red, grayish, or purplish clay is frequently encountered. A number of "gall spots" are included in the type representing areas where the surface soil has been washed away, leaving a grayish or Indian red clay. This type of soil closely resembles the Durham coarse sandy loam in surface appearances.

The Granville coarse sandy loam has already been mapped in Granville, Richmond, and Wake counties, and areas will probably be encountered in the adjoining counties, particularly in Durham County. This soil is especially adapted to the production of bright yellow tobacco. It produces a beautiful leaf which sells at high prices, being in demand for cigarettes and smoking tobacco. In addition to tobacco, corn, oats, rye, crimson clover, sweet potatoes, peanuts, and garden vegetables are successfully grown. This type is well developed in the vicinity of Creedmoor and to the north of Apex.

The Granville coarse sandy loam, "shallow phase," consists of a gray to purplish gray, coarse to medium sandy loam. The subsoil is a coarse sandy clay of variegated color (purplish, bluish, gray, Indian red or white) to a depth of about 24 to 36 inches, grading into sticky, plastic, micaceous clay of greenish-gray, or Indian red color. This is an erosion phase, representing areas where the original sandy surface material has been largely removed. This phase has a small development. Tobacco gives a darker and heavier leaf, while the yields of corn and grains are equal to those of the typical type.

## AVERAGE CHEMICAL ANALYSIS OF GRANVILLE COARSE SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
		Vola- tile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface)	2mm. {	-----	.021	.035	1.12	.15	383	638	20404	2733
Subsoil)		-----	.021	.029	1.725	.111	1597	2207	131252	8446

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Typical:							
Surface soil...	15.3	23.9	10.4	14.5	8.1	19.2	8.0
Subsoil.....	9.2	14.5	6.5	10.1	4.9	31.1	23.3
Lower subsoil	2.6	5.3	4.1	16.2	5.7	30.4	35.6
Shallow Phase:							
Soil.....	15.1	23.7	14.1	22.6	8.0	12.7	3.2
Subsoil.....	1.0	2.1	3.1	21.9	12.4	34.7	24.5

## GRANVILLE FINE SANDY LOAM.

The surface soil of this type, to a depth of about 4 to 6 inches, consists of a yellowish-gray, fine to medium sandy loam of rather porous structure. Beneath the surface material occurs a friable, fine to medium yellow sandy clay, sometimes mottled with gray, and grading at about 20 to 30 inches into a mottled sandy clay, in which yellow and bright red are the most pronounced colors. A substratum of Indian red or purplish clay is usually encountered at from 3 to 4 feet below the surface. This is particularly noticeable in road cuts near the streams. This type has been mapped in Richmond and Wake counties. The principal crops grown are corn, cotton, oats, in Richmond County, while tobacco is grown with a fair degree of success in Wake County.

## AVERAGE CHEMICAL ANALYSIS OF GRANVILLE, FINE SANDY LOAM.

						Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
		Vola- tile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface)	2mm. {	-----	.045	.072	.503	.12	878	1405	9819	2146
Subsoil)		-----	.032	.088	1.76	.146	2560	7040	140800	11680



## GRANVILLE GRAVELLY LOAM.

The surface soil is a gray to yellowish-gray, fine sandy loam to a depth of about 6 to 10 inches, with an estimated content of 25 to 50 per cent of small, angular quartz fragments and gravel. The subsoil is a brownish to reddish plastic clay, extending to a depth of 36 inches, mottled in the lower portions with yellowish-gray and red. Most of this type is forested, the cultivated portion being devoted to the production of corn, oats and cotton. This is a small and relatively unimportant type.

## MECKLENBURG SERIES.

The soils of this series have been mapped in rather large bodies in Mecklenburg and Cabarrus counties, and will likely be encountered in Rowan, Davidson, Guilford and other counties in the Piedmont Region. These soils are closely associated with the Iredell soils and, in places appear, to represent Iredell material in an advanced stage of weathering. They are derived from diorite, mica-diorite, metagabbro, and similar rocks. The topography is undulating and gently rolling, and the surface drainage good. The soils are productive, closely approximating in agricultural value the corresponding Cecil types. The members of this series are locally known as the "red black-jack lands."

## MECKLENBURG CLAY LOAM.

The surface soil of this type, locally known as "red black-jack land" consists of 4 to 8 inches of brown to reddish-brown or dull red, heavy loam or clay loam. The subsoil is a yellowish brown, ocher to red-colored clay, extending to a depth of 24 to 30 inches, and having a greasy feel, but at the same time, tenacious and sticky when wet, and cracking open when drying. The soft feel is probably the result of small mica scales present in the subsoil. The rotten rock usually comes within 30 inches of the surface, although in places the heavy clay extends to a depth of 3 or 4 feet or more. This type also has a few rounded iron pebbles or concretions on the surface. On eroded slopes a red, heavy, clay loam or clay is exposed frequently. The clay loam is naturally a very productive and desirable soil, and one which can be built up to a high state of productiveness. It is especially adapted to clovers, vetches, and soy beans, and is also good for cotton, corn, oats, and wheat. Johnson grass is indigenous, and this together with Japan clover, furnishes excellent pasturage.

## AVERAGE CHEMICAL ANALYSIS OF MECKLENBURG CLAY LOAM.

					Pounds of Total Plant Food Constituents per Acre				
					Surface Soil to a depth of 6½ inches, 2,000,000 lbs.				
					Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface	2mm. {	.066	.144	.5110	1.046	1307	2851	10118	20711
Subsoil		.050	.166	.3913	3.075	4000	13280	31304	246000

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	1.5	3.4	5.9	23.9	18.5	16.8	30.4
Subsoil.....	.6	2.4	3.6	12.2	10.3	25.3	45.7
Lower subsoil .....		1.2	4.1	20.8	19.9	28.4	25.6

## MECKLENBURG SANDY LOAM.

The surface soil of this type consists of 6 to 12 inches of dark-brown to reddish-brown sandy loam to light loam. The subsoil to a depth of 20 to 30 inches is a brownish-yellow or ochereous-yellow, sticky, imper-vious clay. Usually below this depth the rotten rock is encountered, but occasionally the clay subsoil extends to a depth of 3 feet or more. On some areas a few small mica scales occur in the subsoil. Iron pebbles are found on the surface throughout the type in many localities. This type is better suited to cotton than the other members of the series. Corn, oats, soy beans, and cowpeas are successfully grown. This soil is easy to till, and warms up and dries out earlier in the spring than the loam or clay loam.

## AVERAGE MECHANICAL ANALYSIS OF MECKLENBURG SANDY LOAM.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	10.5	12.7	8.5	18.1	13.2	20.1	16.7
Subsoil.....	3.3	5.3	5.4	14.3	11.6	17.9	42.1

## MECKLENBURG LOAM.

The surface soil of the Mecklenburg loam, to a depth of 6 to 8 inches, is a loam to a heavy sandy loam, varying in color from dark-brown to reddish-brown. The subsoil is a yellowish-brown or ochre-colored, tenacious clay, extending to a depth of 36 inches. Usually at 24 to 30 inches the subsoil becomes more friable, owing to the presence of partly decomposed rock, and occasionally the bed rock is reached within the 3-foot section. Small, rounded, iron pebbles or concretions are present in the soil in many localities, while small scales of mica are character-istic of the subsoil, giving it a greasy, soft, feel.

This soil is well suited to corn, oats, cotton, and wheat, and is admirably adapted for pasture. Japan clover, Johnson grass, and other grasses are indigenous, where permitted to grow. Cotton matures a few days earlier on it than upon the clay loam. Cotton has a ten-dency to rust, and corn to "french" on all types of this series. Kainit is used to minimize the injury caused by these diseases.

## AVERAGE CHEMICAL ANALYSIS OF MECKLENBURG LOAM.

					Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.053	.106	.717	2.771	1034	2067	13982	54035
Subsoil }	-----	.035	.133	.367	3.42	2800	10640	29360	273600

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	2.3	6.9	7.5	25.2	21.7	19.0	17.3
Subsoil.....	.2	1.8	3.9	13.3	9.5	20.3	51.1

## CONOWINGO SERIES.

The soils of this series are derived from serpentine or talcose schists or steatite. These soils usually have a greasy feel, and are locally known as soapstone lands. The topography is rolling to hilly, and the soils have to be carefully handled to prevent serious erosion. This series will have a small development in the State. Only one member, the Conowingo clay, has thus far been mapped, and that type lies in the Hickory area.

## CONOWINGO CLAY.

The surface soil of the Conowingo clay is a grayish-yellow loam, having a depth of about 8 inches. The subsoil is a reddish clay loam, which grades into a rotten rock, locally called soapstone at about 2 to 5 feet. Gravel and fragments of rock are seen on the surface, and scattered throughout the soil and subsoil. Corn, wheat, and oats are the principal crops grown. Deep plowing and the incorporation of vegetable matter improves the soil. The possibility of using this soil for grapes is demonstrated at Valdese, near Morganton.

## AVERAGE CHEMICAL ANALYSIS OF CONOWINGO CLAY.

					Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface } 3mm. {	-----	.084	.083	1.56	.622	820	810	15229	6072
Subsoil }	-----	.054	.103	1.839	.539	2269	4328	77282	22651

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	15.50	17.16	9.80	16.98	9.22	17.84	12.90
Subsoil.....	14.34	16.46	7.82	12.36	5.84	11.34	31.52

## LOUISA SERIES.

The soils of this series have a very small representation in this State, and are of minor importance, occurring only in a few small bodies. The material is derived from talcose and micaceous schists, and imperfectly crystalline slates. These soils are less productive than the corresponding types of the Cecil series, and more difficult to maintain in good state of productiveness. Only one type has thus far been encountered in the State, the Louisa loam (mapped in the Statesville area as Davie clay loam). Other types will be found in Wake and Lincoln counties.

## LOUISA LOAM.

The surface soil of this type consists of almost a white to yellowish-gray silt loam, or loam, with an average depth of about 8 inches. This passes gradually from the silt loam or clay into a friable clay of yellowish-red color, and this grades at about 15 inches into a red clay. This possesses a greasy, soft feel, due to the presence of small mica scales, which constitutes one of the essential differences between this soil and the Cecil types. This soil is very deficient in humus. Wheat, corn, and tobacco are the main crops grown.

## PENN SERIES.

The Penn Series includes Indian red soils derived from the red sandstone and shales of Triassic. The soils of this series will occur only in small bodies in a few counties of the State, in close association with the Granville soils. They are usually well drained, but at the same time, not so rolling and hilly as the Cecil soils, occurring mainly in the shallow basins of the Piedmont region. In this series the Penn silt loam has been mapped in Richmond County.

## PENN SILT LOAM.

The surface soil of the type to a depth of 4 to 8 inches, consists of a light-red to dark Indian red, heavy, silt, loam, or silty clay loam. The subsoil is a plastic, heavy, clay, or silty clay of deep Indian red color, which usually grades into a purple or brown fine sandstone at 24 to 30 inches. Small flakes of mica impart a smooth, velvety feel. This type also includes a gray, fine, sandy loam, which belongs to the Granville series. The surface consists of level, undulating to rolling areas.

Cotton, corn, oats and wheat are the principal crops. Liming, incorporation of organic matter, and deeper and better preparation are essential for the improvement of the Penn silt loam.

## AVERAGE CHEMICAL ANALYSIS OF PENN SILT LOAM.

Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.									
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface		.0295	.025	.661	.101	563	477	12612	1927
Subsoil		.0325	.016	1.57	.142	2579	1270	124595	11269

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil		1.4	.6	6.6	15.8	53.1	22.5
Subsoil		1.1	1.2	1.8	2.0	49.7	44.2

## HERNDON SERIES.

The soils of the Herndon Series occupy high, isolated hills or ridges in the Piedmont region, and are derived principally from quartzite and quartzite schists. Many of the low mountains and monadocks will be occupied by the Herndon soils. The Herndon stone loam mapped in Caswell County, is the only member of the series thus far encountered.

## HERNDON STONY LOAM.

The Herndon Stony Loam to a depth of about 6 inches is a yellowish-gray or gray fine, sandy loam, containing about 30 to 60 per cent of rock fragments of quartzite schists, and fine gravel. The subsoil is yellow, fine, sandy clay, which passes into a red clay at about 12 to 15 inches. Stone interferes with cultivation of this soil, and it is best suited to forestry and pasturage.

## ROUGH GULLIED LAND.

(This was mapped Caswell sandy loam in Caswell County.) In reality, the Caswell sandy loam should have been divided into Appling sandy loam and Rough Gullied Land. The greater part of it or rather that part of it occupying the more gently rolling to rolling areas, should be Appling sandy loam; while the rough, broken, eroded hillsides, should be included as Rough Gullied Land. The surface soil is a light gray, yellowish-gray or ashy-colored medium sandy loam to a depth of

6 to 10 inches, and usually contains a few fragments of gneiss and quartz. This type includes spots of Cecil, fine, sandy loam. The subsoil is a yellow, sandy clay, more or less streaked and mottled with red. On slopes it grades into a disintegrated rock at about 20 to 40 inches, and in places the decayed rock joins the surface material on the slopes. The more uniform areas produce an excellent quality of bright yellow tobacco. Corn, wheat, and oats give low yields, but these can be increased by filling the soil with organic matter and barnyard manure. The roughest areas should remain forested, or be reforested or seeded as pasture purposes.

#### ALTAVISTA SERIES.

The soils of this series are developed as well defined to rather indistinct terraces or second and third bottoms along the streams, and lie above normal overflow. These soils are encountered in the Piedmont Region, or in the near-by Coastal Plain Region along the streams arising in the Piedmont. Typically, the material is of an alluvial origin, and consists of sediment brought down and deposited when the streams flowed at higher levels than at present. In places near the slopes some colluvial material has washed down, and modified the alluvial sediments. In places the subsoil appears to be at least partly residual in origin. The natural surface drainage over the greater part of this type is good, and only the lower lying and flatter areas require much artificial ditching. These soils are considered fairly productive, and are amenable to the use of improved machinery. Corn, oats, cotton and cowpeas are the principal crops grown.

The Altavista Series consists of the following types: loam, fine sandy loam, sandy loam, and silty loam. Only small areas have or will be encountered in the State.

#### ALTAVISTA FINE SANDY LOAM.

The Altavista fine sandy loam consists of a light, gray, fine sandy loam, having a depth of about 6 to 10 inches. The subsoil, to a depth of 3 feet or more is a stiff, compact, heavy, fine sandy clay or clay loam, varying in color from pale yellow to yellow, slightly mottled with shades of gray and brown. In the forested areas the surface few inches is darkened by organic matter, giving a dark gray color. Most of the type is under cultivation, and is used for the production of corn, cotton, oats, and cowpeas.

#### AVERAGE MECHANICAL ANALYSIS OF ALTAVISTA FINE SANDY LOAM.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	.1	.4	2.0	31.8	34.6	24.4	6.4
Subsoil.....		.2	1.1	21.6	19.0	33.0	25.0

## ALTAVISTA LOAM.

The Altavista Loam consists of a light gray to dark gray silty loam to fine sandy loam, passing into a pale yellow silty to fine sandy loam at about 8 inches. This pale, yellow stratum extends to about 12 to 14 inches. The typical subsoil is a heavy, friable to plastic, silty, fine sandy clay of yellow color. Slight hummocks or low ridges are more nearly a fine sandy loam underlain by a pale, red, fine to medium sandy clay. In slight depressions the surface soil is dark gray to almost black, heavy, silty or clay loam, with a clay subsoil showing mottlings of red and drab. This is naturally a strong and productive soil. It is used now for the growing of cotton, corn, and oats, and the yields are satisfactory.

## AVERAGE MECHANICAL ANALYSIS OF ALTAVISTA LOAM.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	5.0	11.1	7.3	12.8	8.3	46.9	7.7
Subsoil.....	3.2	8.6	6.8	13.7	5.1	34.7	28.4

## ALTAVISTA SILT LOAM.

The surface soil of the Altavista Silt Loam consists of a gray to yellowish-gray silt loam, to a depth of about 8 to 10 inches. The subsoil, to a depth of about 15 to 20 inches is a dull, yellow, or drab, silty clay. Below 20 to 24 inches, the material shows a yellow or drab, stiff, plastic clay, showing also considerable mottling of red. In places the red mottlings give way to gray. The surface soil is smooth, and possesses a floury feel, and when once plowed and harrowed, a good tilth is secured. Corn and oats give best returns, although cotton can be grown on the higher and better drained areas.

## AVERAGE CHEMICAL ANALYSIS OF ALTAVISTA SILT LOAM.

					Pounds of Total Plant Food Constituents per Acre				
					Surface Soil to a depth of 6½ inches, 2,000,000 lbs.				
					Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Vola- tile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface } 2mm. {	-----	.024	.018	.28	.16	480	360	5600	3200
Subsoil } 2mm. {	-----	.017	.0161	.442	.337	1360	1288	35360	26960

## CONGAREE SERIES.

The Congaree Series represents the River Flood Plains and first bottom lands lying along the streams in the Piedmont Plateau Region. These soils usually lie only a few feet above the normal water-level of the streams. The surface is prevailingly flat, with slight undulating

and hummocky areas near the stream channels and few depressions adjoining the uplands. The natural surface drainage is poor, and much of the land is subject to overflow during freshets. Ditching and occasional diking is necessary for the drainage and reclamation of this land in order to restore it to the position of agricultural utilization. The material is derived from the soils of the Piedmont Region, and some admixture of the Appalachian has been washed down and deposited by the streams, thus building up flat alluvial lands. Small mica scales are characteristic of this series, and are distributed throughout both the soil and subsoil in many areas. These soils are naturally very productive, but have no very extensive development occurring in narrow belts along the rivers and streams. Yields of from 50 to 100 bushels of corn per acre are not unusual for the Congaree soils.

The following types are represented in the Congaree Series: fine sand, fine sandy loam, loam, silt loam, silty clay loam and clay.

#### CONGAREE FINE SAND.

The Congaree fine sand consists of 6 to 10 inches of grayish brown to chocolate brown fine sand or loamy fine sand, underlain by fine sand or loamy fine sand of a slightly darker color than the surface soil. In a few localities a fine sand or silty loam is encountered at a depth of about 2 feet. The soil has an uniformly mellow structure, and is very easy to cultivate. The soil is well suited to the production of corn, oats, cotton and watermelons. Owing to the fact that it is better drained, the Congaree fine sand is a more desirable soil for the production of cotton and watermelons than the Congaree loam.

#### AVERAGE CHEMICAL ANALYSIS OF CONGAREE FINE SAND.

						Pounds of Total Plant Food Constituents per Acre			
						Surface Soil to depth of 6½ inches, 2,000,000 lbs.			
						Subsoil to depth of 28 inches, 8,000,000 lbs.			
	Volat- ile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface	2mm. {	.034	.005	1.742	1.432	680	100	34840	28640
Subsoil		.012	.003	1.88	.28	960	240	150400	22400

#### CONGAREE FINE SANDY LOAM.

The surface soil of this type is a light brown, chocolate brown, or reddish brown fine sandy loam, varying in depth from about 8 to 15 inches. The subsoil, extending to the depth of 3 feet or more, is somewhat variable in texture, but is generally a fine sandy loam or silty loam, being more compact than the surface soil. The surface soil is mellow and friable, and works up into a good loose tilth. The texture is such that excellent capillary action is established, and the supply of moisture is adequate for crops. This soil is well suited to the production of corn, oats, pumpkins, rye and watermelons, and in the southern part of the State, to cotton.



## AVERAGE CHEMICAL ANALYSIS OF CONGAREE FINE SANDY LOAM.

					Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface) 2mm. {	-----	.049	.151	2.04	.92	980	3020	40800	18400
Subsoil) {	-----	.020	.150	2.10	.81	1600	12000	168000	64800

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Soil.....	1.4	8.1	8.9	32.8	19.5	17.5	11.4

## CONGAREE LOAM.

The surface soil of the Congaree loam is a grayish brown to a chocolate brown loam or silty loam, varying in depth from 6 to 10 inches. The subsoil, to a depth of 3 feet, is a light brown or chocolate loam, or heavy silty loam, grading in places into a silty clay. This type includes spots of fine sandy loam, and frequently bodies of silt loam. In general, the type is very similar to the silt loam, containing as it does an exceptionally high silt content, as shown from the mechanical analysis. It, like its associated types, is well adapted to corn, oats and grasses. It lends itself admirably to the use of farm machinery, working up to a mellow tilth.

## AVERAGE CHEMICAL ANALYSIS OF CONGAREE LOAM.

					Pounds of Total Plant Food Constituents per Acre Surface Soil to depth of 6½ inches, 2,000,000 lbs. Subsoil to depth of 28 inches, 8,000,000 lbs.				
	Volatile matter	Nitrogen	Phosphoric acid	Potash	Lime CaO	Nitrogen	Phosphoric acid	Potash	Lime CaO
Surface) 2mm. {	-----	.077	.036	1.728	.935	1493	698	33513	18133
Subsoil) {	-----	.173	.071	1.700	.879	13683	5616	134463	69525

## AVERAGE MECHANICAL ANALYSIS.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....	.3	.8	.5	16.9	13.8	5.28	14.7
Subsoil.....		1.6	1.3	19.9	13.8	45.2	18.2

## CONGAREE SILT LOAM.

The surface soil consists of a brown, chocolate-brown, and in a few places a reddish-brown silt loam, to a depth of about 8 to 15 inches. It is underlain by a light-brown or chocolate-brown silty loam of rather compact structure. Occasionally at 30 inches the material passes into a blue or drab colored, heavy, silt loam. In some places a brown, silty, clay loam is encountered. This type includes numerous patches of fine sandy loam, fine sand, and loam. The typical areas of this type work up into a mellow soil easily handled with modern machinery. The Congaree silt loam is peculiarly adapted to corn, grasses, and pumpkins. It is held in high esteem as a corn soil.

## AVERAGE CHEMICAL ANALYSIS OF CONGAREE SILT LOAM.

Pounds of Total Plant Food Constituents per Acre  
 Surface Soil to depth of 6½ inches,  
 2,000,000 lbs.  
 Subsoil to depth of 28 inches,  
 8,000,000 lbs.

	Vola- tile matter	Nitro- gen	Phos- phoric acid	Potash	Lime CaO	Nitrogen	Phos- phoric acid	Potash	Lime CaO
Surface) 2mm. {	-----	.134	.1122	1.28	1.125	2680	2244	25600	22500
Subsoil) {	-----	.063	.0932	1.071	2.090	5040	7456	85680	187200

## CONGAREE SILTY CLAY LOAM.

The surface soil of this type consists of a brown to a reddish-brown silty clay loam, having a depth of 12 to 15 inches. The subsoil to a depth of 3 feet or more is a brown to reddish-brown silty loam to silty clay loam, averaging a little lighter in texture than the surface soil. The type includes spots of rather light loam to fine sandy loam, the sandier areas occurring mainly near streams. With the exception of a few areas, the soil is mellow and easily tilled. Most of this type is now in wild grasses, and only a few areas are devoted to the production of corn. It is especially suited to corn and grasses, and large yields can easily be obtained.

## AVERAGE MECHANICAL ANALYSIS OF CONGAREE SILTY CLAY LOAM.

	Fine gravel, per cent	Coarse sand, per cent	Medium sand, per cent	Fine sand, per cent	Very fine sand, per cent	Silt, per cent	Clay, per cent
Surface soil.....		.3	.3	1.9	13.2	56.4	27.9
Subsoil.....			.9	8.1	28.6	35.4	26.8

## LOCATION OF EXPERIMENTS.

Experimental field work is now being conducted on five of the larger and more important soil-type areas of the Piedmont Region of the State. The results secured in these experiments have given us much information of practical value with reference to the plant-food deficiencies, and the fertilizer requirements of the different types of soil for the chief crops of the different sections of the Piedmont Plateau in which the experiments have been conducted. The work is at present located at the following places:

1. The Central Farm which lies about two miles west of Raleigh in Wake County. This farm is about 400 feet above sea level.

2. The Iredell Test Farm which is located about one and one-half miles northwest of the town of Statesville in Iredell County. It is well up in the Piedmont Section of the State and has an elevation of about 950 feet above sea level. This is one of seven test farms owned and operated by the State Department of Agriculture.

3. Charlotte field No. 1 located on the farm of W. M. Long, four miles southwest of the center of Charlotte; and Charlotte field No. 2 on the farm of O. H. Bailes, eleven miles southwest of Charlotte.

4. The Monroe field, situated one and one-quarter miles west of the town of Monroe on the farm of J. J. Crow.

5. The Gastonia field, two and one-half miles south of Gastonia on the farm of C. M. Faires.

## FERTILIZERS USED AT THE CENTRAL AND IREDELL FARMS.

At these farms, the fertilizer was applied in the drill just before planting the crop, the exact quantity of material for each row being weighed out separately so that each would get its proper amount of the several fertilizer constituents. Acid phosphate was used as the source of phosphoric acid; dried blood as the source of nitrogen; manure salt as the source of potash, and rock or building lime for lime. The fertilizer materials were analyzed each year and applications made on basis of actual analyses, so as to give the exact quantities of nitrogen, phosphoric acid, and potash indicated for each plat. For the sake of simplicity and convenience in presenting the results of a number of years' experiments, the fertilizer applications are expressed in terms of acid phosphate containing 16 per cent available phosphoric acid, dried blood containing 13 per cent nitrogen, and manure salt containing 20 per cent potash, which figures represent the average composition of these materials. The normal (NPK) fertilizer application for cotton in the experiments is 400 pounds of a mixture containing 7 per cent available phosphoric acid and  $21\frac{1}{2}$  per cent each of nitrogen and

potash; for corn at the rate of 300 pounds per acre of a mixture containing 7 per cent available phosphoric acid, 3 per cent nitrogen and  $1\frac{1}{2}$  per cent potash; and for cowpeas at rate of 300 pounds per acre of a mixture containing 8 per cent available phosphoric acid, 1 per cent nitrogen and 4 per cent potash. Lime was applied at the rate of 500 pounds rock or building lime, or 1,000 pounds slaked lime. The fertilizer applications in the tables, in addition to being represented in terms of acid phosphate, dried blood, and manure salt, are also expressed in terms of the symbols N, P, K, and L, which have the following significance:

N equals: for cotton, at rate of 10 pounds nitrogen per acre, or 77 pounds of 13 per cent blood; for corn, 9 pounds per acre, or 69.2 pounds of 13 per cent blood; and for cowpeas, 3 pounds per acre, or 23 pounds 13 per cent blood.

P equals: for cotton, at rate of 28 pounds phosphoric acid per acre, or 175 pounds of 16 per cent acid phosphate; for corn, 21 pounds per acre, or 131 pounds of 16 per cent acid phosphate; and for cowpeas, 24 pounds per acre, or 150 pounds 16 per cent acid phosphate.

K equals: for cotton, at rate of 10 pounds potash per acre, or 50 pounds 20 per cent manure salt; for corn, 4.5 pounds per acre, or 22.5 pounds 20 per cent manure salt; and for cowpeas, 12 pounds per acre, or 60 pounds 20 per cent manure salt or its equivalent of some other potash salt.

L equals: for all the crops, lime at the rate of 500 pounds rock or 1,000 pounds slaked lime per acre.

The following prices have been used in all the experiments in figuring the cost and the value of crops:

Acid phosphate, 16 per cent, \$14.00 per ton.

Dried blood, 13 per cent, \$60.00 per ton.

Manure salt, 20 per cent, \$20.00 per ton.

Rock lime, \$10.00 per ton.

Cowpea hay, \$18.00 per ton.

Oat and vetch hay, \$18.00 per ton.

Red clover hay, \$18.00 per ton.

Wheat straw, \$6.00 per ton.

Corn stover, \$10.00 per ton.

Corn, 80 cents per bushel.

Cowpeas, \$1.75 per bushel.

Wheat, \$1.00 per bushel.

Seed cotton, 4.5 cents per pound.

#### FERTILIZERS USED ON SOIL TYPE FIELDS.

The fertilizing materials used on the Monroe, Gastonia, the two Charlotte fields, and on Field E of the Iredell Test Farm as carriers of the different elements of plant food were as follows:

Dried blood for nitrogen.

Acid phosphate for phosphoric acid.

Potassium sulphate for potash.

Rock lime for lime.

The rate of application is based on the amounts of phosphoric acid, nitrogen and potash known to be removed by maximum yields. This may seem high to some but many such yields are yearly obtained in the State and over twice this amount has been produced on a measured acre. Even on these more or less depleted soils, a yield of nearly 80 bushels per acre on Charlotte field No. 2 has been obtained by the use of commercial fertilizers alone. In order to secure the required amount of plant food, it was necessary to apply the following amounts of materials for corn:

- 13 per cent dried blood—1,138 pounds.
- 16 per cent acid phosphate—331 pounds.
- 50 per cent sulphate of potash—170 pounds.

In calculating for maximum yields of corn, wheat, oats, cotton and red clover the following figures were used in determining the applications of blood, acid phosphate and manure salt required per acre:

Crop	Yield	Pounds of Different Plant Food Constituents Required		
		Nitrogen	Phosphoric Acid	Potash
Corn.....	100 bu. grain and 3 tons stover.....	148	53	85
Corn.....	100 bu. grain (stover turned under)....	100	39	23
Wheat.....	50 bu. grain and 2½ tons straw.....	96	37	58
Oats.....	75 bu. grain and 2 tons straw.....	73	28	62
Cotton.....	1000 lbs. lint, and 2000 lbs. seed (first year) and 6000 lbs. stalks.....	137	59	165
Cotton.....	1000 lbs. lint and 2000 lbs. seed (second year).....	88	39	86
Red clover.....	3 tons.....	*120	35	100

\*Applied only 40 lbs. N., assuming that two-thirds of it was taken from atmosphere.

Lime was applied at the rate of 1,000 pounds of rock lime per acre annually, except in 1912 and 1914 it was left off of the Gastonia, Iredell Field E, and the two Charlotte fields. On the soil type fields, the fertilizing materials were always carefully weighed out each year and applied uniformly broadcast over the plats. As soon as applied they were immediately harrowed or disked in and seeding of the crop made.

#### ANALYSES OF SOILS OF EXPERIMENTAL FIELDS.

Below will be found the amounts of nitrogen, phosphoric acid, potash and lime in the top and in the subsoil of the soil of each of the experimental fields. The top soil is calculated as weighing 2,000,000 pounds per acre to the depth of 6 $\frac{2}{3}$  inches; and the subsoil as weighing 8,000,000 pounds to a depth of 28 inches beneath the top soil. From the chemical analyses the calculations are made of the number of pounds of each of the plant food constituents contained in top and subsoil of each field.

Pounds of Plant Food Constituents Per Acre

Fields	Sampled From—	Surface Soil—6½ Inches				Subsoil—23 Inches			
		Nitrogen (N)	Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )	Potash (K <sub>2</sub> O)	Lime (CaO)	Nitrogen (N)	Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )	Potash (K <sub>2</sub> O)	Lime (CaO)
Central Farm:	Plat Nos.:								
Field A.....	4, 12, 19.....	793	528	3251	5510	2353	4557	19539	26044
Field B.....	5, 14.....	745	497	2736	5572	1633	3456	18008	26979
Iredell Farm:									
Field A, Series I.....	4, 11, 18.....								
Series II.....	4, 11, 18.....	1183	1147	7767	3820	3120	7600	33400	35600
Field B, Series I.....	5, 14.....								
Series II.....	5, 14.....	1245	950	5260	4550	2400	8200	22120	23120
Field C, Series I.....	8.....								
Series II.....	8.....	1120	1600	7290	9100	2280	12800	19440	17720
Field E.....	7.....	1028	923	8534	1153	1740	8075	25402	3293
Charlotte No. 1.....	6.....	1153	1348	10513	3576	1732	3889	48492	12123
Charlotte No. 2.....	7.....	1159	7176	7636	30544	2795	12595	20231	23224
Monroe.....		704	921	10872	5616	2897	5794	76293	13647
Gastonia.....	8.....	931	941	41089	1562	1794	8112	98592	4836

\*The analyses used to represent the soil of this field is the average of the samples of this type of soil taken in the soil survey work in Mecklenburg, Cabarrus, and Richmond Counties.

In the table above is given not only data with reference to the composition of the different soils but a record is made of the plats of the different fields from which the soil samples for analyses were drawn.

#### RATE OF SEEDING OF ALL CROPS.

The rate of seeding on the different experimental fields was the same. For the different crops the manner and rate of seeding were as follows:

Corn was planted in 4-foot rows, and about 8 pounds of seed were used per acre.

Wheat was sown broadcast or drilled at the rate of  $1\frac{1}{4}$  to  $1\frac{1}{2}$  bushels per acre.

Oats were sown broadcast or drilled at the rate of 2 bushels per acre.

Cotton was planted in  $3\frac{1}{3}$  to 4-foot rows, the seed being put in at the rate of a bushel per acre.

Red clover was seeded broadcast during the early spring on fall-sown wheat, using about 12 to 15 pounds of seed per acre.

Crimson clover was sown during the early fall and lightly covered by means of a spike toothed harrow or single horse cultivator.

Cowpeas were sown broadcast in late spring or early summer at the rate of about 4 pecks per acre.

Rye was sown during the early fall at the rate of 4 pecks per acre.

Hairy vetch, sown with oats, went in at the rate of 30 pounds of vetch seed with about  $1\frac{1}{2}$  bushels of Red Rust Proof oats.

#### TREATMENT AND RESULTS ON CHARLOTTE FIELD NO. I.

The soil of this field is typical Cecil clay. This type of soil is found more or less widely distributed throughout the Piedmont Region of the State, and of other States through which the Piedmont Plateau extends. The field is typical of the soil in Mecklenburg and Gaston counties. In both the counties we find this soil type running comparatively high in phosphoric acid. These experiments were started in the spring of 1910. The field was laid off into ten one-thirtieth acre plats, the plats being 20 by 72.6 feet and a four-foot space between plats. Corn was the first crop of the following two year rotation grown on the field:

First Year—Corn, with cowpeas.

Second Year—Cotton, with crimson clover.

The cowpeas in the rotation are sown broadcast in the corn at the last cultivation, and the crimson clover in the cotton after the first picking. As these crops were grown in the rotation purely for soil improvement, they were in all cases turned back into the soil. The cowpeas did not in any of the years get more than eight to ten inches high and bore but few pods. The crimson clover sown during the falls of 1911 and 1913 in the cotton plats made practically very little showing.

In the following table is given the fertilizer treatment, the yields from the different plats and the gains resulting from each fertilizing constituent used alone and in combination with the other two on this field:





Gain for Phosphoric Acid with Potash.....	-0.6	-200	-120
Gain for Phosphoric Acid, with Nitrogen and Potash.....	4.0	50	-188
AVERAGE GAIN FOR PHOSPHORIC ACID.....	3.5	228	-85
Gain for Potash alone.....	4.3	381	67
Gain for Potash and Nitrogen.....	-2.5	-220	83
Gain for Potash with Phosphoric Acid.....	4.3	-360	-120
Gain for Potash with Nitrogen and Phosphoric Acid.....	-1.1	-250	-8
AVERAGE GAIN FOR POTASH.....	-0.9	-2	6
Gain for Lime alone.....	7.0	366	127
Gain for Lime with Nitrogen Phosphoric Acid and Potash.....	-2.1	-300	-30
AVERAGE GAIN FOR LIME.....	2.5	33	49

<sup>1</sup> The yields on this plat during 1912, 1913 and 1914 were somewhat reduced by the growth of shade trees and by the depredations of chickens, particularly so with corn in 1914.

As a result of three years' tests with corn and one year's test with cotton, it is quite evident that the chief plant food deficiencies of the soil of this field are nitrogen and phosphoric acid. The use of phosphoric acid alone yielded on an average above the unfertilized plat an increase of 8.0 bushels of corn and 541 pounds of stover, and 67 pounds of seed cotton; and of nitrogen alone 6.9 bushels of corn and 121 pounds of stover, and 172 pounds of seed cotton per acre. Potash alone and lime alone produced 4.3 and 7.0 bushels of corn; 381 and 366 pounds of stover; and 67 and 127 pounds of seed cotton increases respectively per acre. On this field, the greatest gains for each of the plant food constituents were secured when they were used alone.

The average gain for each element, given in the lower section of the table, has been computed from the figures in the main table. For example, there are four plats, each one of which received exactly the same treatment as some other plat except that nitrogen was applied in addition. In each case the gain for nitrogen may be determined. Plat 2 for instance, yielded on an average at the rate of 6.9 bushels of corn and 121 pounds of stover, and 172 pounds of seed cotton more than plat 6; plat No. 5 yielded at the rate of 1.5 bushels of corn and 100 pounds of stover, and 8 pounds of seed cotton more than plat 2; plat 7 at the rate of 0.1 bushel of corn and minus 40 pounds of stover and 188 pounds of seed cotton more than plat 4; and plat 9 at the average rate 4.7 bushels of corn and 210 pounds of stover, and 120 pounds of seed cotton more than plat 8. The average of these four are the average gains, as will be seen in Table 1, of 3.3 bushels of corn and 98 pounds of stover, and 122 pounds of seed cotton per acre. The average gains for phosphoric acid, potash and lime with each crop are secured in the same manner.

On an average, the gain with corn is greater from the phosphoric acid applications but with cotton the nitrogen applications produced the larger increases. Taking the results as a whole nitrogen at the present time seems the more essential constituent for this soil, particularly so for the growth of cotton. Lime next to nitrogen and phosphoric acid seems to be more essential than potash for the growth of such crops as corn and cotton. The marked benefits of applications of nitrogen and phosphoric acid compared with potash certainly justifies the assumption that the nitrogen and phosphoric acid must be increased if maximum crops are to be produced permanently on this soil. Such an assumption is in accord with the chemical analysis of this soil which shows it to be high in potash. The surface  $6\frac{2}{3}$  inches contains enough of this material for nearly 124 one hundred bushel corn crops, while it is deficient in both phosphoric acid and nitrogen. Twenty-seven such crops would require an amount of phosphoric acid equal to the total existing in the top  $6\frac{2}{3}$  inches, while less than one-third this number would use up all the nitrogen.

#### TREATMENT AND RESULTS ON CHARLOTTE FIELD NO. II.

The soil of Charlotte field No. 2 is typical Iredell loam, high phosphoric acid phase. This type occurs quite widely over the Piedmont section of the State, and is generally known as "black-jack" soil. The experiments at this farm were started at the same time as those on Charlotte Field No. 1. The plats are one-twentieth acre in size. The

rotation was identical for both except that rye was substituted in this field for crimson clover in seeding the cotton plats during the fall of 1911. The growth of the cowpeas generally was better on the plats of this field not receiving blood in the fertilizer application. The plats receiving blood were generally covered with a growth of crab grass. This grass was hardly apparent on the plats from which the nitrogen application was omitted. The possible explanation for this condition was that the rank growth of grass which was favored by the liberal



Fig. 1. Showing the growth of corn in 1910 on Plats 12 (NPK) and 13 (O) of Charlotte Field No. 2. The marked difference in growth on Plat 12, receiving a complete fertilizer, over Plat 13, to which no fertilizer was applied, was due largely to the nitrogen in the fertilizer mixture.

use of dried blood held in check the cowpeas in their growth. Then again, too, the ranker growth of corn on those plats receiving the nitrogen carrier did undoubtedly affect the growth of the peas.

The stand of rye in 1911 was good on all the plats, but made decidedly the best growth on those plats receiving an application of blood. The rankest growth was made on plats 8, 9, 12 and 14. The stand of crimson clover in the spring of 1914 was poor over all the plats, it not being over 40 per cent on March 21. The growth of the clover was slightly better on the nitrogen plats than on any of the others, the poorest growth of all being made on plat 13. The following table gives the fertilizer treatment, and results recorded on this field.

TABLE II.—RESULTS ON IREDELL LOAM OF CHARLOTTE FIELD NO. 2, MECKLENBURG COUNTY.

Plat No.	Treatment	Yield per Acre						Cotton				Average Increase Due to Different Fertilizer Treatments		Total Value of Five Years' In- crease of All Crops		
		Corn			Average			1913		Aver- age Seed Cotton, Lbs.	Corn		Seed Cotton, Lbs.			
		1910		1912		1914		Seed Cotton, Lbs.	Grain, Bus.		Stover, Lbs.	Grain, Bus.			Stover, Lbs.	
		Grain, Bus.	Stover, Lbs.	Grain, Bus.	Stover, Lbs.	Grain, Bus.	Stover, Lbs.			Seed Cotton, Lbs.			Grain, Bus.			Stover, Lbs.
1	None.....	29.4	2380	29.4	2700	40.0	3160	32.9	2747	1400	920	1160	---	---	---	\$-----
2	Lime.....	31.7	2640	30.3	2420	47.7	3600	36.6	2887	1560	1220	1390	3.7	140	230	
3	Nitrogen.....	69.7	3740	79.7	3920	57.1	4200	68.8	3853	2060	1180	1620	39.4	1426	510	162.02
4	None.....	22.6	2200	26.6	2000	38.9	3380	29.4	2527	1320	900	1110	---	---	---	5.68
5	Phosphoric Acid.....	24.0	2240	26.3	2080	39.4	3420	29.9	2580	1400	900	1150	0.5	53	40	
6	Potash.....	24.0	1960	23.1	2260	41.4	3320	29.5	2513	1540	1080	1310	0.9	126	230	24.76
7	None.....	22.3	1920	20.9	2060	42.6	3180	28.6	2387	1200	960	1080	---	---	---	145.10
8	Nitrogen, Phosphoric Acid.....	57.7	3200	74.3	3280	62.3	4240	64.8	3573	1820	1240	1530	36.2	1186	450	
9	Nitrogen, Potash.....	55.7	3160	71.4	3080	67.7	5560	64.9	3933	1740	1540	1640	46.2	2013	700	204.16
10	None.....	12.6	1460	14.9	1600	28.6	2700	18.7	1920	1180	700	940	---	---	---	10.18
11	Phosphoric Acid, Potash.....	12.9	1480	12.9	1800	26.9	3080	17.6	2120	1360	740	1050	-1.1	200	110	
12	Nitrogen, Phosphoric Acid, Potash.....	53.4	3140	76.6	3880	59.7	4180	63.2	3733	1800	1520	1660	49.9	2206	830	227.56
13	None.....	10.6	1240	10.0	1340	19.4	2000	13.3	1527	1100	560	830	---	---	---	215.78
14	Lime, Nitrogen, Phosphoric Acid, Potash.....	50.3	2920	61.7	3440	60.6	5040	57.5	3800	1800	1540	1670	44.2	2273	840	
Gain for Nitrogen alone.....																
Gain for Nitrogen with Phosphoric Acid.....																
														39.4	1426	510
														35.7	1133	410

Gain for Nitrogen with Potash.....	45.3	1887	470
Gain for Nitrogen with Phosphoric Acid and Potash.....	51.0	2006	720
AVERAGE GAIN FOR NITROGEN.....	42.9	1613	528
Gain for Phosphoric Acid alone.....	0.3	53	40
Gain for Phosphoric Acid with Nitrogen.....	-3.2	-240	-60
Gain for Phosphoric Acid with Potash.....	-2.0	74	-120
Gain for Phosphoric Acid with Nitrogen and Potash.....	3.7	193	130
AVERAGE GAIN FOR PHOSPHORIC ACID.....	-0.3	20	-3
Gain for Potash alone.....	0.9	126	230
Gain for Potash with Nitrogen.....	6.8	587	190
Gain for Potash with Phosphoric Acid.....	-1.6	147	70
Gain for Potash with Nitrogen and Phosphoric Acid.....	13.7	1020	380
AVERAGE GAIN FOR POTASH.....	5.0	470	218
Gain for Lime alone.....	3.7	140	230
Gain for Lime with Nitrogen, Phosphoric Acid and Potash.....	-5.7	67	10
AVERAGE GAIN FOR LIME.....	-1.0	104	120

The results of five years' tests of this field certainly show that nitrogen is decidedly in greatest need by this soil. The returns per acre, above that secured from the unfertilized plat, from the three crops of corn and the two crops of cotton were more than twenty times as much for nitrogen alone as for phosphoric acid alone, and more than six and one-half times as much as for potash used alone. Nitrogen alone on an average has given 39.4 bushels of corn and 1,426 pounds of stover, and 510 pounds of seed cotton increases per acre. Phosphoric acid used alone has only averaged a gain of 0.5 bushels of corn and 53 pounds of stover, and 40 pounds of seed cotton, potash alone an average gain of



Fig. II. Rye as a cover crop after cotton, sown during fall of 1911 on Charlotte Field No. 2 and photographed the following spring just before breaking the land for corn. Note the difference in growth of rye secured on the two plats (7 and 8) for turning into the soil.

0.9 bushels of corn and 126 pounds of stover, and 230 pounds of seed cotton, and lime alone 3.7 bushels of corn and 140 pounds of stover, and 230 pounds of seed cotton per acre. On an average of three years' results with corn and two with cotton, the average gain for nitrogen used alone and in combinations has been 42.9 bushels of corn and 1,613 pounds of stover, and 528 pounds of seed cotton.

For phosphoric acid a decrease of 0.3 bushels of corn and 3 pounds of seed cotton and an increase of 20 pounds of stover; for potash an increase of 5.0 bushels of corn and 470 pounds of stover, and 218 pounds of seed cotton; and for lime a decrease of one bushel in the yield of corn, but an increase of 104 pounds of corn stover, and 120 pounds of seed cotton per acre. Phosphoric acid used with nitrogen or potash alone seems to have had on an average a rather depressing effect upon

the yield, but when used with the two together this does not seem to be true, although on an average there is practically but little increase in the yields of the two crops. The decided benefit of applications of nitrogen to this soil certainly justifies the conclusion that in order to produce large crops permanently on this type of soil that nitrogen in some available form must be added. Such a conclusion is borne out by the chemical analysis of this soil which shows that it is high in phosphoric acid but very low in content of nitrogen. Although the amount of potash present is fairly high yet the results indicate that next to nitrogen with corn and cotton this is the plant food constituent standing next to nitrogen as a limiting factor in crop yields for the soil in its present condition. The surface  $6\frac{2}{3}$  inches of this soil contains enough phosphoric acid for about 135 one hundred bushel corn crops; potash for 90 crops; and only enough nitrogen for less than 8 crops of corn of this size.

#### TREATMENT AND RESULTS ON MONROE FIELD.

The soil of this field is typical Alamance silt loam which has been derived from shales. The field was established in 1911, but the first crop which was corn was lost. The plats are of the same size and dimensions as Charlotte Field No. 2. The rotation that has been used on the field is as follows:

First Year—Corn.

Second Year—Oats and vetch, with cowpeas.

Third Year—Cotton, with crimson clover.

As the cowpeas and crimson clover of the rotation have been grown for soil improvement they have in all cases been plowed into the soil. The cowpeas, sown broadcast in the summer of 1913 over the plats after the oats and vetch were removed for hay, made a fairly satisfactory growth, the best growth having been produced on plat 10. On this plat the vines were on September 9 of a very dark green color and were on an average about thirty inches high. On the other plat (No. 1) receiving lime, the vines were about twenty inches high and on all the other plats, except for those receiving no fertilizers, the vines were of a yellowish color and varied in height from twelve to fourteen inches. The plat treatment with results of yields of corn, cotton, and oat-and-vetch hay are recorded in the following table:

TABLE III.—RESULTS ON ALAMANCE SILT LOAM SOIL OF MONROE FIELD, UNION COUNTY.

Plot No.	Treatment	Yield per Acre				Average Increase Due to Different Fertilizer Treatments				Total Value of Three Years' Increase of All Crops
		Corn		Oat and Vetch Hay, Pounds	Seed Cotton, Pounds	Corn		Oat and Vetch Hay, Pounds	Seed Cotton, Pounds	
		Grain, Bushels	Stover, Pounds			Grain, Bushels	Stover, Pounds			
1	Lime.....	12.1	840	6760	570	5.1	340	4180	—190	\$ 34.85
2	Nitrogen.....	9.3	660	7740	740	2.3	160	5160	—20	48.18
3	Phosphoric Acid.....	7.9	500	2660	800	0.9	0	80	40	2.44
4	None.....	7.0	500	2580	760					
5	Potash.....	6.4	740	4800	1440	—0.6	240	2220	680	51.30
6	Nitrogen, Phosphoric Acid.....	18.4	1180	10000	1280	11.4	680	7420	520	102.70
7	Nitrogen, Potash.....	9.6	860	8040	1160	2.6	360	5460	400	71.02
8	Phosphoric Acid, Potash.....	7.1	520	6720	1140	—6.3	20	4140	380	49.42
9	Nitrogen, Phosphoric Acid, Potash.....	28.3	1800	10160	1220	21.3	1300	7580	460	112.46
10	Lime, Nitrogen, Phosphoric Acid, Potash.....	26.7	1880	7260	1520	19.7	1380	4680	760	98.98
AVERAGE GAIN FOR NITROGEN.....										
Gain for Nitrogen alone.....										
Gain for Nitrogen with Phosphoric Acid.....										
Gain for Nitrogen with Potash.....										
Gain for Nitrogen with Phosphoric Acid and Potash.....										
AVERAGE GAIN FOR NITROGEN.....										
Gain for Phosphoric Acid alone.....										
Gain for Phosphoric Acid with Nitrogen.....										
Gain for Phosphoric Acid with Potash.....										
Gain for Phosphoric Acid with Nitrogen and Potash.....										
AVERAGE GAIN FOR PHOSPHORIC ACID.....										
Gain for Phosphoric Acid.....										



Gain for Potash alone.....	-0.6	240	2220	680
Gain for Potash with Nitrogen.....	0.3	200	300	420
Gain for Potash with Phosphoric Acid.....	-0.8	20	4060	340
Gain for Potash with Nitrogen and Phosphoric Acid.....	9.9	620	160	-60
AVERAGE GAIN FOR POTASH.....	2.2	270	1685	345
Gain for Lime alone.....	5.1	340	4180	-190
Gain for Lime with Nitrogen, Phosphoric Acid and Potash.....	-1.6	80	-2900	300
AVERAGE GAIN FOR LIME.....	1.8	210	640	55

The results thus far secured on this field, as a whole, show that nitrogen and phosphoric acid are the chief plant food deficiencies of this soil. The use of potash alone, too, has shown good gains in oat-and-vetch hay and in seed cotton per acre, the total increased yields of all three of the crops from the plat receiving potash alone being a little in excess of the value of the total yields from the plat which received a nitrogen application alone. However, potash, when added to an application of phosphoric acid and nitrogen, only increased the yields of the crops to the value of 9.5 per cent. On a whole, the potash applications do not show up as marked increases in yields of the different crops over the unfertilized plat as do the different applications of nitrogen and phosphoric acid.

Although the use of phosphoric acid alone had practically no influence upon yields, yet when this constituent was added to an application of nitrogen, the yields per acre of all the crops were more than double in value of those secured from an application of nitrogen alone. Potash added to a nitrogen application increased the yields per acre to the value of 47 per cent over nitrogen used alone. The average gains per acre were for the different constituents alone and in combinations: for nitrogen 9.3 bushels of corn and 580 pounds of stover, 4,795 pounds of air dried oat-and-vetch hay, and 65 pounds of seed cotton per acre; for phosphoric acid, 7.4 bushels of corn and 370 pounds of stover, 1,595 pounds of oat-and-vetch hay, and 85 pounds of seed cotton; for potash, 2.2 bushels of corn and 270 pounds of stover, 1,685 pounds of oat-and-vetch hay, and 345 pounds of seed cotton; and for lime, 1.8 bushels of corn and 210 pounds of stover, 640 pounds of oat-and-vetch hay, and 55 pounds of seed cotton. Lime when used alone gave its best results with all the crops. The increases in corn and in oat-and-vetch hay were good, but a decrease of 190 pounds per acre resulted in the yield of seed cotton.

The most marked increases from the different applications were obtained with the oat-and-vetch hay.

The results on this field would seem to justify the assumption that, if large crops are to be produced on this land permanently, additions of carriers of nitrogen and of phosphoric acid will have to be made. The results, too, indicate that at the present time the use of potash in available form will increase the yields of oat-and-vetch hay, seed cotton and possibly other crops. Although additions of potash have given fairly good increases in yields, the soil is well supplied with this constituent, there being enough present in the surface  $6\frac{2}{3}$  inches of this type of soil on an average for about 128 one hundred bushel corn crops. The potash is evidently in a form not easily assimilated by the plant roots. The assumption above with reference to the nitrogen and phosphoric acid requirements of this type of soil is in accord with the chemical analysis. Seventeen one-hundred bushel crops of corn would require an amount of phosphoric acid equal to the total present in the top  $6\frac{2}{3}$  inches, while five such crops would more than use up all the nitrogen.

#### TREATMENT AND RESULTS ON GASTONIA FIELD.

The type of soil on which this field is located is Cecil sandy loam, which is exceptionally uniform throughout. This is one of the most



Fig. III. Corn shocked on the plats of the Gastonia Field, ready to husk.



Fig. IV. Wheat on Plats 6 (NP) and 7 (NK) at the Gastonia Field in 1911. Note the marked difference in height of wheat resulting from a substitution of phosphoric acid for potash in the fertilizer application.

important soil-types not only of Gaston County, but of the whole Piedmont Section of the State. This soil is commonly known as "gray land."

The experiments were started on this field in the spring of 1910 on plats of the same size and dimensions as those of Charlotte field No. 2. The rotation that has been adopted is as follows:

First Year—Corn, with cowpeas.

Second Year—Wheat, with cowpeas and rye.

Third Year—Cotton, with crimson clover.

In the rotation the cowpeas, rye and crimson clover were not harvested but were plowed into the soil for improvement of it. The cowpeas in



Fig. V. Wheat on Plats 9 (NK) and 10 (NPK) at the Gastonia Field in 1911. Note the greater height and rankness of growth on Plat 10, resulting from the addition of nitrogen to the PK application.

the first year of the rotation were sown broadcast in the corn at the last cultivation. While those grown during the second year were put in broadcast after the wheat had been removed and the land had been broken and fitted in proper shape for the seeding. Rye during the fall of 1911 was seeded broadcast on the plats after the cowpea vines had been turned and the land fitted for the seeding. Although the rye went in rather late, yet a fairly good stand was secured and the rye made a fairly satisfactory growth on all the plats, particularly so on those to which a carrier of phosphoric acid was added. Decidedly the best growth was made on plats 11, 10, 9, 6, and 4 in about the order given.

Crimson clover was sown in the cotton field in 1912 in the way indicated for two Charlotte fields. The growth of the crop was markedly better on those plats to which phosphoric acid and lime were added. On March 20, 1913, the growth of the clover on plat 11 was approximately three times as great as on plat 10, which received the same fertilizer application but to which no lime was added. The color of the clover, too, was of a much darker green color on plat 11 than on plat 10. The clover on all the plats was turned on April 24 and the land



Fig. VI. Wheat grown at the Iredell Farm and fertilized with nitrogen and potash. Growth but little better than the unfertilized plat.

double disked. Early in May the corn was planted. The cowpeas sown in this crop of corn on the plats at the last cultivation made only poor growth. During the fall after the peas had completed their growth, the fertilizers for the wheat crop were broadcast over the plats and disked in. On November 28, the wheat was drilled in a well prepared seed bed. The stand of wheat secured on all the plats was good. The wheat on plats receiving an application of acid phosphate made the largest growth, the best growth of all being made by plat 11.

In Table IV will be found the different treatments given to plats of this field and the results of each of these on the yields of corn, wheat and cotton grown in rotation:

TABLE IV.—RESULTS ON CECIL SANDY LOAM SOIL OF GASTONIA FIELD, GASTON COUNTY.

Plot No.	Treatment	Yield per Acre						Average Increase Due to Different Fertilizer Treatments				Total Value of Five Years' Increase of All Crops
		Corn			Wheat			Corn				
		1910	1913	Average	1911	1914	Ave.	Seed Cotton, 1912, Lbs.	Grain, Bus.	Stover, Bus.	Wheat, Bus.	
		Grain, Bus.	Stover, Lbs.	Grain, Bus.	Stover, Lbs.	Grain, Bus.	Stover, Lbs.	Grain, Bus.	Stover, Bus.	Wheat, Bus.	Seed Cotton, Lbs.	
1	None.....	29.1	2210	18.0	1200	23.6	1705	8.7	3.7	6.2	525	\$
2	Lime.....	30.2	1990	24.9	1360	27.6	1675	10.7	3.5	7.1	605	
3	Nitrogen.....	41.7	2580	24.6	1520	33.2	2050	12.0	4.0	8.0	475	
4	Phosphoric Acid.....	35.1	2440	39.1	2460	37.1	2450	16.0	20.0	18.0	880	
5	Potash.....	31.1	2570	26.6	2240	28.9	2405	9.3	4.0	6.7	830	
6	Nitrogen, Phosphoric Acid.....	53.4	3460	41.4	3060	47.4	3260	29.3	24.7	27.0	1065	
7	Nitrogen, Potash.....	44.6	2230	26.6	2340	35.6	2285	15.7	11.3	13.5	785	
8	None.....	28.9	1830	21.7	1680	25.3	1755	12.7	6.5	9.6	435	
9	Phosphoric Acid, Potash.....	35.4	2470	25.4	1820	30.4	2145	12.3	8.7	10.5	775	
10	Nitrogen, Phosphoric Acid, Potash.....	48.9	2980	35.4	2880	42.2	2930	28.7	28.0	28.4	950	
11	Lime, Nitrogen, Phosphoric Acid, Potash.....	46.9	2820	42.0	3160	44.5	2990	29.0	24.0	26.5	1190	
	Gain for Nitrogen alone.....											
	Gain for Nitrogen with Phosphoric Acid.....											
	Gain for Nitrogen with Potash.....											
	Gain for Nitrogen with Phosphoric Acid and Potash.....											
	AVERAGE GAIN FOR NITROGEN.....											
	Gain for Phosphoric Acid alone.....											
	Gain for Phosphoric Acid with Nitrogen.....											

Gain for Phosphoric Acid with Potash.....	-0.2	-310	0.4	-15
Gain for Phosphoric Acid with Nitrogen and Potash.....	6.6	645	14.9	165
AVERAGE GAIN FOR PHOSPHORIC ACID.....	8.1	460	10.7	284
Gain for Potash alone.....	5.3	700	0.5	305
Gain for Potash with Nitrogen.....	0.7	185	2.1	350
Gain for Potash with Phosphoric Acid.....	-8.4	-355	-10.9	-65
Gain for Potash with Nitrogen and Phosphoric Acid.....	-5.2	-330	1.4	-115
AVERAGE GAIN FOR POTASH.....	-1.9	50	-1.3	119
Gain for Lime alone.....	4.0	30	0.9	80
Gain for Lime with Nitrogen, Phosphoric Acid and Potash.....	2.3	60	-1.9	240
AVERAGE GAIN FOR LIME.....	3.2	45	-0.5	160

The results certainly indicate that phosphoric acid and nitrogen are the fertilizing constituents first needed by this soil. Phosphoric acid alone gave an increase of 13.5 bushels corn and 745 pounds of corn stover, 11.8 bushels wheat and 355 pounds of seed cotton; while nitrogen alone yielded an increase of 9.6 bushels of corn and 345 pounds of corn stover 1.8 bushels of wheat, and minus 50 pounds of seed cotton per acre. Potash alone gave an average increase per acre of 5.3 bushels of corn and 700 pounds of corn stover, 0.5 bushels of wheat, and 305 pounds of seed cotton. Lime alone as well as in combination with the other plant food constituents, like potash, made a poor showing. The results show that for these crops at the present time neither potash nor lime can be used profitably on this soil in its present state.

The average gain for four nitrogen plats, when used alone and in combinations, are 8.8 bushels of corn and 430 pounds of stover, 7.2 bushels of wheat, and 86 pounds of seed cotton.

The gain for phosphoric acid with corn was about the same as the average gain for nitrogen, but the gains on an average were about 49



Fig. VII. Wheat grown at the Iredell Farm and fertilized with nitrogen, phosphoric acid and potash. Note marked difference in growth resulting from the addition of phosphoric acid, by contrasting the wheat in this with that shown in Fig. VI.

per cent greater with wheat and 230 per cent greater with cotton from the phosphoric acid applications than from the nitrogen applications. The average of the four cases where potash forms the only difference in treatment shows a decrease of 1.9 bushels of corn and 1.3 bushels of wheat and an increase of 50 pounds of stover and 119 pounds of seed cotton. It will be observed from the results given in the last column of the table that the greatest value of increased yields over the unfertilized plats was secured from plat 6, which received an application consisting of acid phosphate and dried blood, but had no carrier of potash applied. The increased yields from plats 11 and 10 over the unfertilized plat were respectively next highest in value. The marked benefits resulting from applications of carriers of phosphoric acid and nitro-



gen compared to potash certainly justifies the assumption that the phosphoric acid and nitrogen supplies of this soil must be increased if large crops are to be grown permanently on the soil. Such an assumption is in accord with the chemical analysis of this soil which shows it to be abnormally high in potash. The surface 6 $\frac{2}{3}$  inches contains enough of this material for about 483 one hundred bushel corn crops, while it is deficient in both phosphoric acid and nitrogen. Eighteen such crops would require an amount of phosphoric acid equal to the total existing in the top 6 $\frac{2}{3}$  inches, while six such crops would use up all the nitrogen.

TREATMENT AND RESULTS ON FIELD E, IREDELL TEST FARM.

The soil of this field is of the same character as that of all the other fields at the Iredell farm. One-twentieth acre plats were laid off and the experiments started in the spring of 1910. Corn was the first crop grown in the following five-year rotation used on this field:

- First Year—Corn, with cowpeas.
- Second Year—Cotton, with rye.
- Third Year—Oats, with soy beans.
- Fourth Year—Wheat, with red clover.
- Fifth Year—Red clover.

In this rotation the cowpeas, rye, soybeans and the last crop of red clover are grown and turned into the soil for its improvement. As the red clover seeded during the spring of 1913 failed, crimson clover was seeded on the plats during the following fall, cowpeas in the spring of 1914 and crimson clover again in the fall of 1914 in order to make the conditions in the rotation as near as possible those of a successful clover crop. The stand and growth of crimson clover and cowpeas were the best on plats 14, 2, 8 and 5. The different fertilizer treatments received by the several plats of this field with their results upon the yields of corn, cotton, oats, wheat and red clover are contained in the following table:



Gain for Nitrogen with Potash.....	8.1	780	335	700	1.9	250	5000
Gain for Nitrogen with Phosphoric Acid and Potash.....	3.3	420	45	380	9.8	1370	6400
AVERAGE GAIN FOR NITROGEN.....	5.6	465	98	1010	1.0	490	4300
Gain for Phosphoric Acid alone.....	7.7	360	340	1000	14.3	865	200
Gain for Phosphoric Acid with Nitrogen.....	7.4	340	140	1560	8.4	1415	3600
Gain for Phosphoric Acid with Potash.....	8.8	440	175	160	-4.3	-460	800
Gain for Phosphoric Acid with Nitrogen and Potash.....	4.0	200	-115	840	3.6	660	2200
AVERAGE GAIN FOR PHOSPHORIC ACID.....	7.0	335	135	890	5.5	620	1700
Gain for Potash alone.....	-0.4	60	-5	60	2.0	80	-1000
Gain for Potash with Nitrogen.....	2.1	320	225	60	4.8	435	2800
Gain for Potash with Phosphoric Acid.....	0.7	140	-170	-780	-16.6	-1245	-400
Gain for Potash with Nitrogen and Phosphoric Acid.....	-1.3	180	-30	-660	0	-320	1400
AVERAGE GAIN FOR POTASH.....	0.3	175	5	-330	-2.5	-263	700
Gain for Lime alone.....	1.8	180	-155	250	-3.0	-220	260
Gain for Lime with Nitrogen, Phosphoric Acid and Potash.....	1.5	200	45	1300	-3.9	-30	-500
AVERAGE GAIN FOR LIME.....	1.7	190	-55	775	-3.5	-125	-120

\*The Red Clover practically failed, and this cutting was chiefly crab grass.

The results on this field show this type of soil to be chiefly deficient in nitrogen and phosphoric acid as are the soils of the Charlotte No. 1, Monroe and Gastonia fields. These results are in striking contrast to those secured from Charlotte field No. 2, on which the use of phosphoric acid practically failed to show any increase in growth and yield of the different crops used in the rotation followed on that field. In the production of the seed of corn, cotton and wheat on Field E, phosphoric acid on an average almost doubled the increased yield, over the unfertilized plats, that were secured on an average from the nitrogen applications; while in the yield of stover and hay the use of nitrogen gave a greater increase over the unfertilized plat than did the phosphoric acid applications. The increase in yield of air-dried oat-and-vetch and crab grass hay was more than doubled on an average with nitrogen than was secured with the applications of phosphoric acid. The average gains for nitrogen and phosphoric acid were: for nitrogen, 5.6 bushels of corn and 465 pounds of stover, 98 pounds of seed cotton, 1,010 pounds of oat hay, 1 bushel of wheat and 490 pounds of wheat straw, and 4,300 pounds of mixed hay; and for phosphoric acid, 7.0 bushels of corn and 335 pounds of stover, 135 pounds of seed cotton, 890 pounds of oat hay, 5.5 bushels of wheat and 620 pounds of wheat straw, and 1,700 pounds of mixed hay.

Potash used with a nitrogen application seems to have had a beneficial effect upon the production of crab grass and clover hay, but when applied alone or with phosphoric acid alone it seems to have had a depressing effect upon the yield of the mixed hay.

On an average, oats and corn, and the leguminous cover crops used on this field were apparently the only crops of the rotation benefited by the applications of lime. With the soil of this field as with others discussed above, the chemical analyses of the soil are in close accord with the field results. In the surface 6 $\frac{1}{2}$  inches of this soil there is enough potash present to provide for the growing of more than 100 one hundred bushel corn crops, but the nitrogen and phosphoric acid supply of this soil would be exhausted in 7 and 17 years respectively by the annual growth of such crops.

#### FERTILIZER EXPERIMENTS AT THE CENTRAL FARM.

The soil of the Central farm on which the experiments were conducted is of the Cecil sandy loam type.

The plats are embraced in Fields A and B. The soil of these fields was badly run down when the experiments were started in 1902. The plats in Field A were laid off in two series parallel to each other, there being sixteen plats to the series, and the plats of the two series joining directly on to each other without any driveway or turn row between the series. At the east end of the first series, and at the west end of the second series, there is a 10-foot driveway. The plats are one-twentieth acre in size and measure 132 feet long and 16 $\frac{1}{2}$  feet wide. There is neither a row nor extra space between the plats in the different series. Field B lies immediately south of Field A, and the plats of this field are laid out in a similar manner and are of the same size as those of the latter field.

During 1902, 1903, and 1904, cotton was grown continuously on Field A and corn on Field B, but since that time up to the present, these two crops have been grown in rotation in alternate years on the two fields. In Tables VI and VII are given the results secured with cotton and corn on the different plats of the two fields at this farm.

TABLE VI.—RESULTS WITH COTTON ON FIELDS A AND B AT THE CENTRAL TEST FARM.<sup>1</sup>

Plat No.	Treatment	Average Yield of Seed Cotton per Acre.		Average Increase per Acre Due to Fertilizer	Value of Increase at 4.5 Cents per Pound	Cost of Fertilizer per Acre	Average Value of Increase Over Cost of Fertilizer
		For Field A (In 1902, '03, '04, '06, and '08)	For Field B (In 1905, '07, and '09)				
4-5	O.....				\$.....	\$.....	\$.....
1-1	NP.....	1154.5	768.2	415.1	18.68	3.54	15.14
2-2	NK.....	994.6	437.7	169.9	7.65	2.81	4.84
3-3	PK.....	1126.0	895.3	464.4	20.90	1.73	19.17
(4+12)-5	O.....						
5-4	NPK.....	1130.8	925.7	524.6	23.61	4.04	19.57
(5 <sup>2</sup> +13 <sup>2</sup> )-(4 <sup>2</sup> +14 <sup>2</sup> )	O.....						
12 <sup>2</sup> -11 <sup>2</sup>	L.....	619.5	320.1	31.9	1.44	0.63	0.81
(13 <sup>2</sup> +19 <sup>2</sup> )-(4 <sup>2</sup> +14 <sup>2</sup> )	O.....						
14 <sup>2</sup> -12 <sup>2</sup>	NPKL.....	1007.2	975.3	572.7	25.78	4.67	21.11

#### EFFECT OF VARYING QUANTITIES OF NITROGEN.

(4+12)-5	O.....				\$.....	\$.....	\$.....
6-6	N ½ PK.....	873.4	918.1	433.5	19.51	2.88	16.63
5-4	NPK.....	1130.8	925.7	524.6	23.61	4.04	19.57
(4+12)-14	O.....						
7-7	N2PK.....	996.5	1023.6	589.4	26.52	6.35	20.17
8-8	N3PK.....	961.4	1030.5	616.8	27.76	8.66	19.10

#### EFFECT OF VARYING QUANTITIES OF PHOSPHORIC ACID.

(4+12)-5	O.....				\$.....	\$.....	\$.....
9-9	NP½K.....	673.3	922.9	460.4	20.72	3.42	17.30
5-4	NPK.....	1130.8	925.7	524.6	23.61	4.04	19.57
(4+12)-14	O.....						
10-10	NP2K.....	898.6	1089.8	748.0	31.41	5.26	26.15
11-11	NP3K.....	947.3	1084.5	761.2	34.25	6.49	27.76

<sup>1</sup>Detailed results are given in Bulletin 227, North Carolina Experiment Station.

TABLE VI.—*Continued.*

## EFFECT OF VARYING QUANTITIES OF POTASH.

Plat No.	Treatment	Average Yield of Seed Cotton per Acre		Average Increase per Acre Due to Fertilizer	Value of Increase at 4.5 Cents per Pound	Cost of Fertilizer per Acre	Average Value of Increase Over Cost of Fertilizer
		For Field A (In 1902, '03, '04, '06, and '08)	For Field B (In 1905, '07, and '09)				
12-5	O.....				\$.....	\$.....	\$.....
13-12	NPK ½.....	844.3	909.8	625.1	28.13	3.79	24.34
(4+12)-5	O.....						
5-4	NPK.....	1130.8	925.7	524.6	23.61	4.04	19.57
12-14	O.....						
14-13	NPK 2.....	903.0	957.5	654.4	29.45	4.54	24.91
(12+19)-14	O.....						
15-15	NPK 3.....	811.2	898.3	555.2	24.99	5.04	19.95

## EFFECT OF VARYING QUANTITIES OF FERTILIZER.

(12+19)-14	O.....				\$.....	\$.....	\$.....
16-16	½ (NPK).....	706.2	744.4	403.0	18.14	2.02	16.12
(4+12)-5	O.....						
5-4	NPK.....	1130.8	925.7	524.6	23.61	4.04	19.57
5 <sup>2</sup> -14	O.....						
1 <sup>2</sup> -17	1½ (NPK).....	1162.8	1126.9	701.0	31.55	6.05	25.50
5 <sup>2</sup> -14 <sup>2</sup>	O.....						
2 <sup>2</sup> -1 <sup>2</sup>	2 (NPK).....	1215.1	992.3	668.4	30.08	8.07	22.01
3 <sup>2</sup> -2 <sup>2</sup>	3 (NPK).....	1335.1	1053.1	759.0	34.15	12.11	22.04

## RESULTS WITH COTTON AT RALEIGH.

*Effect of Nitrogen, Phosphoric Acid, Potash and Lime in Combinations.*—The experiments, the results of which are presented in Table VI were planned to determine the effect upon the yield of cotton when two of the constituents were applied together, as nitrogen and phosphoric acid (N P), nitrogen and potash (N K), and phosphoric acid and potash (P K), and when all three of the fertilizing constituents were applied to make a complete fertilizer (N P K); also to test the effect of lime (L) when used alone and when used in connection with a complete fertilizer (N P K L). The results are shown in yields of seed cotton per acre for the several years, average yields, average increases over the unfertilized (O) plats which represent the effect of the fertilizer applications, the value of increase, cost of the fertilizer, and value of the increased yields over cost of fertilizer.

Nitrogen and Phosphoric acid, N P (Plats 1 and 1). Nitrogen and phosphoric acid alone gave increased yields over the unfertilized plats for all eight years on the plats in the two fields, the average annual increase for five years in Field A being 326.1 pounds seed cotton per acre, and for the three years in Field B being 504.1 pounds seed cotton, or an average annual increase for eight years in the two fields of 415.1 pounds per acre, worth \$15.14 over the cost of the fertilizer applied.

Nitrogen and Potash, N K (Plats 2 and 2). From an application of nitrogen and potash combined there were small average increased



Fig. VIII. Cotton on plats at Central Farm. Plat 12, unfertilized (O) in center; Plat 11, high phosphatic fertilization with normal amounts of nitrogen and potash (NP3K) on right; and Plat 13, low potassic fertilization with normal amounts of phosphoric acid and nitrogen (NPK $\frac{1}{2}$ ) on left. NP3K plat yielded more than nine times and NPK $\frac{1}{2}$  more than seven times as much seed cotton as the unfertilized (O) plat.

yields on the plats of the two fields, the average for the five years being 166.2 pounds seed cotton for Field A, and 173.6 pounds as an average of 3 years for Field B, or an average annual increase for both fields of 169.9 pounds of seed cotton per acre, worth \$4.84 over the cost of fertilizer used.

Phosphoric Acid and Potash, P K (Plats 3 and 3). Phosphoric acid and potash combined gave increased yields on all the plats in the two fields, the average annual increase for five years in Field A being 297.6 pounds and for three years in Field B 631.2 pounds; or an average for the eight years in the two fields of 464.4 pounds, worth \$19.17 over cost of fertilizer.

Nitrogen, Phosphoric Acid and Potash, N P K (Plats 5 and 4). These three materials combined in a complete fertilizer gave increased yields in all the tests on all the plats in two fields, the average annual increase for five years in Field A being 387.5 pounds of seed cotton per

acre, and for three years in Field B being 661.6 pounds, or an average annual increase per acre for the eight years on the two fields of 524.6 pounds of seed cotton per acre, worth \$19.57 above cost of fertilizer.

Lime, L (Plats 12<sup>2</sup> and 11<sup>2</sup>). Lime was applied at the rate of 500 pounds of rock or 1,000 pounds slaked lime per acre every fourth year. On plat in Field A during five years there was an average annual increase of 41.4 pounds seed cotton per acre, and on plat in Field B during three years an average increase of 22.4 pounds per acre, or on an average, an annual increase from both of the fields of 31.9 pounds per acre, worth \$0.81 annually per acre above the cost of the lime.

Lime with Complete Fertilizer, N P K L (Plats 14<sup>2</sup> and 12<sup>2</sup>). Where lime was used in combination with the three fertilizer constituents there was 84.9 pounds more of seed cotton produced per acre on an average in Field A than where the normal (N P K) application was used, and on Field B an average of 11.4 pounds more seed cotton per acre, or an annual average 48.1 pounds per acre from the use of lime in connection with the normal application of fertilizer. The average annual increase due to the use of lime was worth \$1.54 per acre above cost of the lime.

Taking the experiments as a whole, the average results show the following:

That phosphoric acid is the plant food constituent that gave decidedly the largest increase in yield and the greatest profit per acre.

That potash and nitrogen in the amounts used in the experiments gave only slight increase and profit per acre, the former constituent on an average gave a slightly greater profit per acre than did the latter.

That lime when used alone had very little, if any, effect upon yield, but when applied in connection with a normal (N P K) application of fertilizer there was some better show for the lime.

The main increased yields and profits, therefore, came from phosphoric acid; the next most profitable constituent was potash, nitrogen in the amount used only showing an average profit per acre above cost of 40 cents for the use of 10 pounds of nitrogen used with 28 pounds of phosphoric acid and 10 pounds of potash.

*Effect of Varying Quantities of Nitrogen.*—This part of the tests was planned to determine the effect on the yield of cotton of varying quantities of nitrogen, leaving the phosphoric acid and potash constant. On one plat the nitrogen was reduced to one-half of the normal quantity, making the application 5 pounds of nitrogen per acre or practically 1.9 per cent in the actual fertilizer mixture used. On two of the plats it was increased by 2 and 3 times the normal quantity (10 pounds per acre), making the application 20 and 30 pounds per acre respectively, or on the basis of the fertilizer mixture 5.3 and 6.6 per cent. The average results for five years on plats in Field A show the largest profit per acre above cost of fertilizer to be from the fertilizer application containing normal quantity of nitrogen in the several mixtures, while the average results for three years in Field B the greatest profit was from plats receiving a fertilizer application containing twice the normal quantity of nitrogen in the mixture, or 20 pounds of nitrogen per acre.

Taking the eight years experiments together the average annual results show an average increased yield per acre over unfertilized plats of



433.5 pounds of seed cotton, worth \$16.63 for the fertilizer application containing one-half normal (5 pounds of nitrogen per acre) quantity of nitrogen; 524.6 pounds, worth \$19.57 for the fertilizer containing normal (10 pounds nitrogen per acre) quantity per acre; 589.4 pounds, worth \$20.17 for the fertilizer with twice normal (20 pounds nitrogen per acre) quantity nitrogen; and 616.8 pounds, worth \$19.10 for the mixture containing three times normal (30 pounds nitrogen per acre) quantity of nitrogen with normal amounts of phosphoric acid and potash.

These results indicate that nitrogen is not the most important or controlling constituent for the production of cotton on this soil and that the most profitable quantity of nitrogen to use per acre lies between 10 and 20 pounds per acre.

*Effect of Varying Quantities of Phosphoric Acid.*—This part of the experiment was planned to show the effect on the yields of seed cotton of varying quantities of phosphoric acid, the nitrogen and potash remaining the same. On one plat one-half the normal quantity of phosphoric acid was applied, or an amount represented by 87.5 pounds of 16 per cent acid phosphate and equivalent to 6.5 per cent phosphoric acid in the fertilizer mixture. On two plats were applied two and three times the normal quantities of phosphoric acid, represented by 350 and 525 pounds of 16 per cent acid phosphate respectively, or 56 and 84 pounds of phosphoric acid per acre. The yields show good profits for all of the fertilizer mixtures. In Field A the largest yield and greatest profit per acre was secured on an average from the plat receiving three times normal (525 pounds of 16 per cent acid phosphate carrying 84 pounds of phosphoric acid) phosphoric acid, while in Field B the plat to which a twice normal (350 pounds of 16 per cent acid phosphate carrying 56 pounds of phosphoric acid) application of phosphoric acid with normal amounts of nitrogen and potash gave a slightly increased yield and profit over the plat receiving three times normal (N P<sub>3</sub> K) phosphoric acid. However, as an average of all the tests on both fields there was a slightly greater profit over cost of fertilizer in favor of the heavy (N P<sub>3</sub> K) application.

The results on both of the fields, as well as the averages, show that the normal application (175 pounds of 16 per cent acid phosphate carrying 28 pounds of phosphoric acid per acre) is not sufficient phosphoric acid in this soil for most profitable returns per acre with cotton.

By increasing the phosphoric acid application, with normal quantities of nitrogen and potash present, from 14 pounds to 28 pounds per acre each pound of phosphoric acid added yielded a profit of about 16 cents for each pound of the increase increasing from 28 pounds to 56 pounds per acre each gave a profit of 23.5 cents per pound increase while increasing from 56 to 84 pounds of phosphoric acid per acre only gave an increase of a little less than 5.7 cents per pound for each pound of the 28 pounds of increase in phosphoric acid.

*Effect of Varying Quantities of Potash.*—This portion of the experiments was arranged to show the effect on the yield of seed cotton of varying quantities of potash, the nitrogen and phosphoric acid remaining constant. On one plat only one-half the normal quantity of potash was applied, or 1.8 per cent in the fertilizer mixture, or 5 pounds of

potash per acre, while on two other plats two and three times the normal quantities were given, or 20 and 30 pounds of actual potash per acre respectively. On basis of the normal fertilizer mixture this would represent 5.7 and 7.5 per cent of potash in the mixture.

The results are not uniform for the two fields, the most profitable application being slightly in favor of 5 pounds of potash per acre for Field A and slightly in favor of the use of 20 pounds of potash in Field B. The largest average increase in yield of seed cotton as well as the greatest profit per acre, was obtained from the plats receiving 20 pounds of potash (100 pounds of manure salt) per acre with the regular quantities of nitrogen and phosphoric acid employed in the mixtures.

*Effect of Varying Quantities of Fertilizer on Yields.*—This part of the experiments was planned to show the effect of increasing and decreasing the normal (N P K equals 400 pounds of a fertilizer mixture containing 7 per cent phosphoric acid,  $2\frac{1}{2}$  per cent potash and  $2\frac{1}{2}$  per cent nitrogen) fertilizer application on the yields of cotton. The applications were at the rate of 200 pounds per acre ( $\frac{1}{2}$  N P K); 400 pounds per acre (N P K); 600 pounds per acre ( $1\frac{1}{2}$  N P K); 800 pounds per acre (2 N P K); 1,200 pounds per acre (3 N P K). The results on the two fields and the averages of these fields are quite uniform in showing increased yields and increased profits for the several increases in the amounts of fertilizer up to 600 pounds per acre. On an average of the results of the tests on both fields the use of 800 and 1,200 pounds of the fertilizer mixture per acre gave a greater increase in value of total crop (lint and seed) over cost of fertilizer than did the use of 200 or 400 pounds per acre of the same mixture. The heavier applications, properly proportioned, have not only yielded the largest yields and profits per acre, but in all probability left the land in a more productive state. The results that may be secured from these plats in later years will be helpful in throwing light on the importance of large immediate returns by heavy fertilization and the results such practice will have on the permanent productivity of the soil. Too little attention is given by farmers generally to the matter of the permanent producing power of their soils.

#### RESULTS WITH CORN AT RALEIGH.

*Effect of Nitrogen, Phosphoric Acid, Potash, and Lime in Combination.*—The experiments, the results of which are presented in Table VII, were planned to show the effect on the yield of corn of nitrogen (N), phosphoric acid (P), and potash (K), when two of the constituents were applied together, as nitrogen and phosphoric acid (N P), nitrogen and potash (N K), and phosphoric acid and potash (P K), and when all three of these fertilizer constituents were applied to make a complete fertilizer (N P K); also to test the effect of lime (L) alone and when used in connection with a complete fertilizer (N P K L).

The results are shown in yields of bushels of shelled corn and pounds of stover per acre for the several years, average yields, average increases over the unfertilized (O) plats, which represent the effect of the fertilizer applications, the value of the increase, the cost of the fertilizer, and the value of the increased yield of corn and stover and of corn alone

over cost of fertilizer. The value of the increased yield of corn and stover and of corn alone represent the profit from the several fertilizer applications after paying for the fertilizer itself.

In these experiments the corn was cut, shocked and shredded, the stover being all of the plant except the corn on the cob.

Nitrogen and Phosphoric Acid N P (Plats 1 and 1). A combination of nitrogen and phosphoric acid increased the yields over the unfertilized plats in all eight years in the two fields, the average annual increase for the three years in Field A being 6.5 bushels of corn and 514 pounds of stover per acre; and for five years in Field B 9.6 bushels of corn and 727 pounds of stover; or an average annual increase for the eight years in the two fields of 8.1 bushels of corn and 621 pounds of stover worth \$3.49 over cost of fertilizer for corn alone, or \$6.60 for the increased yield of corn and stover.

Nitrogen and Potash, N K (Plats 2 and 2). There were small aver-

TABLE VII.—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN AT THE CENTRAL TEST FARM.

Plat No.	Treatment	Average Yield per Acre				Average Increase Due to Fertilizer Treatment		Value of Increase with Corn at \$0.80 per Bushel, and Stover at \$10.00 per Ton	Cost of Fertilizer per Acre	Average Value of Increase Over Cost of Fertilizer
		For Field A (In 1905, '07, and '09)		For Field B (In 1902, '03, '04, '06, and '08)		Corn, Bus.	Stover, Lbs.			
		Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.					
4-5	O							\$	\$	\$
1-1	NP.....	20.7	1683	18.8	1521	8.05	621	9.55	2.99	6.56
2-2	NK.....	14.5	1266	11.1	919	1.10	111	1.44	2.30	-0.86
3-3	PK.....	17.2	1405	19.0	1432	6.40	437	7.31	1.14	6.17
(4+12)-5	O									
5-4	NPK.....	17.7	1521	18.4	1518	6.95	571	8.42	3.21	5.21
(5 <sup>2</sup> +13 <sup>2</sup> )- (4 <sup>2</sup> +14 <sup>2</sup> )	O									
12 <sup>2</sup> -11 <sup>2</sup>	L.....	12.9	1152	8.6	729	1.45	114	1.73	0.63	1.10
(13 <sup>2</sup> +19 <sup>2</sup> )- (4 <sup>2</sup> +14 <sup>2</sup> )	O									
14 <sup>2</sup> -12 <sup>2</sup>	NPKL....	18.5	1796	21.8	1567	11.40	898	13.61	3.84	9.77

EFFECT OF VARYING QUANTITIES OF NITROGEN.

(4+12)-(5+14)	O							\$	\$	\$
6-6	N ½ PK	14.4	1122	19.3	1555	6.35	414	7.15	2.18	4.97
(4+12)-5	O									
5-4	NPK	17.7	1521	18.4	1518	6.95	571	8.42	3.21	5.21
(4+12)- (5+14)	O									
7-7	N 2 PK	22.4	1790	22.0	1687	12.35	838	14.07	5.28	8.79
8-8	N 3 PK	24.3	1897	24.5	1878	15.20	1011	17.22	7.35	9.87

TABLE VII.—*Continued.*

## EFFECT OF VARYING QUANTITIES OF PHOSPHORIC ACID.

Plat No.	Treat- ment	Average Yield per Acre				Average Increase Due to Fertilizer Treatment		Value of Increase with Corn at \$0.80 per Bushel, and Stover at \$10.00 per Ton	Cost of Fertilizer per Acre	Average Value of In- crease Over Cost of Fertilizer
		For Field A (In 1905, '07, and '09)		For Field B (In 1902, '03, '04, '06, and '08)		Corn, Bus.	Stover, Lbs.			
		Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.					
4-5 9-9	O NP ½ K	17.1	1511	20.0	1509	10.00	658	\$ 11.29	\$ 2.75	\$ 8.54
(4+12)-5 5+4	O NPK	17.7	1521	18.4	1518	6.95	571	8.42	3.21	5.21
(4+12)- (5+14) 10-10 11-11	O NP 2 K NP 3 K	16.8 17.9	1621 1742	22.9 21.0	1892 1988	11.90 12.15	928 1061	14.16 15.03	4.13 5.05	10.03 9.98

## EFFECT OF VARYING QUANTITIES OF POTASH.

(12+19)- (5+14) 13-12	O. NPK $\frac{1}{2}$ ...	18.2	1811	20.2	1717	12.15	980	\$ 14.62	\$ 3.10	\$ 11.52
(4+12)-5 5-4	O. NPK.....	17.7	1521	18.4	1518	6.95	571	8.42	3.21	5.21
(12+19)- (5+14) 14-13	O. NPK 2....	15.9	1476	21.7	1813	11.45	846	13.39	3.44	9.95
(12+19)-14 15-15	O. NPK 3....	14.6	1528	19.2	1732	9.20	819	11.46	3.66	7.80

## EFFECT OF VARYING QUANTITIES OF FERTILIZER.

(12+19)-14 16-16	O. $\frac{1}{2}$ (NPK)	15.6	1518	16.0	1411	7.80	649	\$ 9.49	\$ 1.61	\$ 7.88
(4+12)-5 5-4	O. NPK.....	17.7	1521	18.4	1518	6.95	571	8.42	3.21	5.21
5 <sup>2</sup> -14 1 <sup>2</sup> -17	O. $1\frac{1}{2}$ (NPK)	19.1	1772	23.5	1891	9.80	784	11.76	4.82	6.94
5 <sup>2</sup> -4 <sup>2</sup> 2 <sup>2</sup> -1 <sup>2</sup> 3 <sup>2</sup> -2 <sup>2</sup>	O. 2 (NPK)... 3 (NPK)...	21.6 24.2	2008 2022	20.3 22.2	1884 2081	9.85 12.15	1006 1111	12.91 15.28	6.42 9.64	6.49 5.64

age increased yields of corn and stover in the two fields from the applications of a mixture of nitrogen and potash, the average for the eight years in the two fields being 1.1 bushels per acre of corn and 111 pounds of stover, which increase on an average was not sufficient to pay for the

fertilizer. This fertilization was therefore at a loss, having cost \$1.42 per acre more annually than the value of the increased yield of corn and 86 cents more than the value of the corn and stover combined.

Phosphoric Acid and Potash, P K (Plats 3 and 3). This mixture of phosphoric acid and potash gave increased yields on all the plats in the two fields, the average annual increase for three years in Field A being 4.7 bushels of corn and 418 pounds of stover per acre; and for five years in Field B 9.8 bushels of corn and 638 pounds of stover, or an average for the eight years in the two fields of 6.4 bushels of corn and 437 pounds of stover, worth \$3.98 over cost of fertilizer on the basis of corn alone, or \$6.17 on the basis of corn and stover.

Nitrogen, Phosphoric Acid, and Potash, N P K (Plats 5 and 4). By combining all three of the fertilizer materials to make a complete fertilizer, increased yields were obtained on the two plats in the two fields, the average annual increase for three years in Field A was 4.7 bushels of corn and 418 pounds of stover per acre; and for five years in Field B 9.2 bushels of corn and 724 pounds of stover, or an annual average increase for the eight years in the two fields of 6.95 bushels of corn and 571 pounds of stover, worth \$2.35 over cost of fertilizer on basis of corn alone, or \$5.21 on basis of corn and stover.

Lime, L (Plats 12<sup>2</sup> and 11<sup>2</sup>). Lime was applied at the rate of 500 pounds rock or 1,000 pounds slaked lime per acre every fourth year. On the plat in Field A during three years there was a profit of \$2.93 per acre from the use of lime, counting the value of corn and stover. On the plat in Field B there was a loss of 73 cents per acre annually, the average for the eight years being a gain of \$1.14 per acre.

Complete Fertilizer with Lime, N P K L (Plats 14<sup>2</sup> and 12<sup>2</sup>). When lime was used in combination with the three fertilizer constituents on Field A, there was an average increase of 4.9 bushels of corn and 578 of stover more from the N P K L application than from N P K. The increase was not uniform for the different years, in fact in 1905 the N P K application produced 6.3 bushels of corn and 208 pounds of stover per acre more than did the application of N P K L. The lime was applied to this field during May, 1903. The average increase in Field B from lime used with a complete fertilizer over a complete fertilizer alone was 4 bushels of corn and 75 pounds of stover per acre. The increases of shelled corn were in each year uniformly larger from the N P K L than from the N P K application.

On an average, taking the results of both fields together, there was an increase due to the lime above the cost of the lime to the value of \$2.93 per acre on the basis of corn alone and of \$4.56 on the basis of corn and stover together.

As an average of all the results, the experiments show:

- (1) That a nitrogen and phosphoric acid mixture added decidedly to the increased yields and profits, the average annual increase being worth \$6.60 per acre above the cost of the fertilizing materials;

- (2) That nitrogen and potash combined increased the yield very slightly but at a loss;

- (3) That on an average phosphoric acid and potash yielded 1.7 bushels of corn and 184 pounds of stover less than did the combination of phosphoric acid and nitrogen;

(4) That potash added to nitrogen and phosphoric acid resulted in a small increase in yield and without profit; and

(5) That the use of lime alone resulted practically in no profit per acre, but when used with nitrogen, phosphoric acid and potash there was a somewhat better showing made.

*Effect of Varying Quantities of Nitrogen.*—These experiments were arranged to test the effect on the yield of corn and stover of varying quantities of nitrogen, leaving the phosphoric acid and potash constant.

On one plat the nitrogen was reduced to one-half the normal quantity, making the application  $4\frac{1}{2}$  pounds of nitrogen per acre, or practically 2.4 per cent in the actual amount of the fertilizer mixture used. On two of the plats it was increased by two and three times the normal quantity (9 pounds per acre) making the application 18 and 27 pounds per acre respectively, or on the four plats  $4\frac{1}{2}$ , 9, 18, and 27 pounds of nitrogen per acre.

The average results for three years in Field A showed the largest profit to have come from the application containing three times the normal quantity of nitrogen per acre, or 27 pounds of nitrogen, the average yield being 24.3 bushels corn per acre, and the profit \$4.65 over cost of fertilizer on the basis of corn alone or \$9.60 on the basis of corn and stover. For five years in Field B the largest yields and profit were too from the application containing three times the normal quantity of nitrogen, the average yield of corn being 24.5 bushels per acre, and the profit \$4.97 over cost of fertilizer, on the basis of corn alone, or \$10.13 on the basis of corn and stover. Averaging the results of both fields, the gain per acre from the use of the  $N_3 P K$  application was \$4.81 on the basis of corn alone and \$9.87 when both corn and stover are considered. On an average as will be seen from the results in Table VII the yields and profits per acre increased as the amount of the nitrogen in the mixture increased.

*Effect of Varying Quantities of Phosphoric Acid.*—This part of the experiments were planned to show the effect on the yields of corn and stover of varying quantities of phosphoric acid, the nitrogen and potash remaining the same. On one plat one-half the normal quantity of phosphoric acid was applied or an amount represented by 65.5 pounds of 16 per cent acid phosphate and equivalent to 6.7 per cent phosphoric acid in the fertilizer mixture. On two plats were applied two and three times the normal quantities of phosphoric acid represented by 263 and 394 pounds of 16 per cent acid phosphate respectively, or 42 and 63 pounds of phosphoric acid per acre. The results in all the fields show increased yields and profits from all the different quantities of phosphoric acid. The largest increase in grain in yield on Field A was from the use of three times normal phosphoric acid with nitrogen and potash, while in Field B it was from the use of three times normal phosphoric acid. On an average of the results of both fields, there was practically no difference in the profit per acre above cost of fertilizer from the two and the three phosphoric acid applications, when the quantities of nitrogen and potash remained the same in the mixtures.

*Effect of Different Quantities of Potash.*—These experiments were arranged to show the effect on the yield of corn and stover of varying

quantities of potash, the nitrogen, and phosphoric acid remaining constant. On one plat only one-half the normal quantity of potash was applied or 1.1 per cent in the fertilizer mixture, or 2.25 pounds of potash per acre. On two other plats two and three times the normal quantities were given, or 9 and 13.5 pounds per acre respectively. This would make the application of potash on the several plats 2.25, 4.5, 9, and 13.5 pounds. The results on an average show that the most profitable application is one containing one-half normal potash with normal quantities of nitrogen and phosphoric acid.

The indications are that  $1\frac{1}{2}$  per cent of potash is all that is needed for corn in this soil when used in connection with the regular quantities of nitrogen and phosphoric acid in the normal corn mixture.

*Effect of Varying Quantities of Fertilizer on Yields.*—These tests show the effect of increasing and decreasing the normal fertilizer application on yields, the normal (N P K) being 300 pounds of a mixture containing 7 per cent phosphoric acid, 3 per cent nitrogen and  $1\frac{1}{2}$  per cent potash. The applications were at the rate of 150 pounds per acre ( $\frac{1}{2}$  N P K); 300 pounds per acre (N P K); 450 pounds per acre ( $1\frac{1}{2}$  N P K); 600 pounds per acre (2 N P K); 750 pounds per acre ( $2\frac{1}{2}$  N P K). The results in all the fields show increased yields and profits for all the quantities of fertilizer. The average results of the two fields taken together show that 150 pounds per acre is the most profitable quantity of the fertilizer mixture to use for corn.

#### FERTILIZER EXPERIMENTS AT IREDELL TEST FARM.

The main type of soil on the farm is red (Cecil) clay loam, the subsoil being a moderately heavy clay, but the surface soil has sufficient sand in it to make it a clay loam rather than a clay, though when freshly plowed it would to a casual observer be looked upon as red clay. The main types of soil in the Piedmont are Cecil sandy loam (gray land), red (Cecil) clay loam and red (Cecil) clay. The clay and clay loam types are rich in potash, very poor in phosphoric acid, the amount of nitrogen depending on the organic matter in the soil.

The plats on which these experiments were conducted were embraced in Fields A, B and C. Fields A and B had been long in cultivation and were badly run down when work was started in 1903. The plats in Field A were laid off in two series parallel to each other, there being twenty plats to the series, with a driveway or turn row between plats. The plats are one-tenth acre in size, or 217.8 feet by 20 feet, with space between plats sufficient for two rows of corn or other crops, the row on either side of each plat being fertilized like the plat which it adjoins.

The plats in Field B were laid out in a similar way and are of the same size.

The plats in Field C were part of an old field, covered with broom sedge, briars, and small pines in 1903. The pines were grubbed out and the other growth turned under with a two-horse plow in the spring of 1903 and cultivated in corn that year, with a fertilizer application of 300 pounds per acre, of the normal corn mixture. In the fall of 1903 crimson clover was sown but no stand was obtained. The land was prepared in the spring of 1904 and laid off in plats of one-twentieth

acre each, the size being 108.9 feet by 20 feet, with space between plats for two extra rows, the rows nearest the plats having four-foot space at the ends of the plats. There are two series of sixteen plats each in this field, with driveway or turn row between.

In the case of all plats on this farm there is a four-foot extra space at the ends.

*Field A.*—These plats were used for fertilizer experiments with cotton in 1903-4-6-9; for fertilizer experiments with corn in 1905-7; for general crop of oats without fertilizer in the fall and spring of 1908; and for fertilizer experiments with peas in the summer of 1908. In case of each of the three crops the same plan or system of fertilization was followed.

*Field B.*—These plats were used for fertilizer experiments with corn in 1903, 1904, 1906, and 1908; for fertilizer experiments with cotton in 1905 and 1907; for a general crop of oats without fertilizer in the fall and spring of 1909, and for fertilizer experiments with peas in the summer of 1909.

*Field C.*—These plats were used for fertilizer experiments with peas in 1904, 1905, 1906, and 1907, a grain crop without fertilization preceding the pea crop in each year except 1904; for fertilizer experiments with cotton in 1908; and for fertilizer experiments with corn in 1909.

No catch crops for the improvement of the soil were grown on these fields during the year 1903-09, but since that time rotations have been arranged for each field in which they have found a place at frequent intervals.

The results of seven years' experiments with cotton, are contained in Table VIII.



TABLE VIII.—RESULTS WITH COTTON ON FIELDS A, B AND C AT THE IREDELL TEST FARM.<sup>1</sup>

Plat No.	Treatment	Average Yield of Seed Cotton per Acre			Average Increase per Acre Due to Fertilizer	Value of Increase at 4.5 Cents per Pound	Cost of Fer- tilizer per Acre	Average Annual Value of Increase Over Cost of Fertilizer
		For Field A (In 1903, '04, '06, and '09)	For Field B (In 1905 and 1907)	For Field C (In 1903)				
4-5 <sup>2</sup> -8	O.....					\$.....	\$.....	\$.....
1-3 <sup>2</sup> -1	N.....	210.6	377.5	505.0	—11.7	—0.53	2.31	—2.84
2-4 <sup>2</sup> -2	P.....	655.6	897.5	860.0	441.8	19.88	1.40	18.48
4-(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
3-6 <sup>2</sup> -3	K.....	301.3	537.5	435.0	85.4	3.84	0.50	3.34
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
5-7 <sup>2</sup> -4	NP.....	897.5	727.5	620.0	520.1	23.40	3.71	19.69
6-8 <sup>2</sup> -5	NK.....	348.8	406.3	400.0	96.5	4.34	2.81	1.53
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8 <sup>2</sup>	O.....							
7-9 <sup>2</sup> -12 <sup>2</sup>	PK.....	855.0	959.8	725.0	608.0	27.36	1.90	25.46
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
8-10 <sup>2</sup> -6	NPK.....	923.8	1002.5	1070.0	717.7	32.30	4.21	28.09
18 <sup>2</sup> -5 <sup>4</sup> -8 <sup>2</sup>	O.....							
14 <sup>2</sup> -4 <sup>4</sup> -7 <sup>2</sup>	L.....	97.5	160.0	430.0	( <sup>2</sup> )27.0	1.22	0.63	0.59
15 <sup>2</sup> -6 <sup>4</sup> -9 <sup>2</sup>	NPKL.....	728.8	637.5	945.0	( <sup>2</sup> )573.5	25.81	4.84	20.97
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
8-10 <sup>2</sup> -6	NPK.....	745.0	1002.5	1070.0	( <sup>2</sup> )706.7	31.80	4.21	27.59

## EFFECT OF VARYING QUANTITIES OF NITROGEN.

(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....					\$.....	\$.....	\$.....
9-11 <sup>2</sup> -7	N ½ PK..	923.1	1005.0	1110.0	737.0	33.17	3.06	30.11
8-10 <sup>2</sup> -6	NPK.....	923.8	1002.5	1070.0	717.7	32.30	4.21	28.09
10-12 <sup>2</sup> -9	N 2 PK..	875.0	1108.0	1285.0	777.5	34.99	6.52	28.47
11-(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
12-13 <sup>2</sup> -10	N 3 PK..	783.0	1038.8	1145.0	698.1	31.41	8.83	22.58

TABLE VIII.—Continued.

## EFFECT OF VARYING QUANTITIES OF PHOSPHORIC ACID.

Plat No.	Treatment	Average Yield of Seed Cotton per Acre			Average Increase per Acre Due to Fertilizer	Value of Increase at 4.5 Cents per Pound	Cost of Fer- tilizer per Acre	Average Annual Value of Increase Over Cost of Fertilizer
		For Field A (In 1903, '04, '06, and '09)	For Field B (In 1905 and 1907)	For Field C (In 1908)				
18-14 <sup>2</sup> -8	O.....					\$.....	\$.....	\$.....
13-15 <sup>2</sup> -11	NP ½ K..	602.5	867.5	875.0	( <sup>2</sup> )420.0	18.90	3.51	15.39
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
8-10 <sup>2</sup> -6	NPK.....	745.0	1002.5	1070.0	( <sup>2</sup> )706.7	31.80	4.21	27.59
18-5 <sup>3</sup> -8	O.....							
14-1 <sup>3</sup> -12	NP 2 K...	771.3	1077.5	925.0	( <sup>2</sup> )651.0	29.30	5.61	23.69
15-2 <sup>3</sup> -13	NP 3 K...	910.0	1192.5	795.0	( <sup>2</sup> )727.0	32.71	7.01	25.71

## EFFECT OF VARYING QUANTITIES OF POTASH.

18-5 <sup>3</sup> -8	O.....					\$.....	\$.....	\$.....
16-3 <sup>3</sup> -14	NPK ½...	742.5	730.0	850.0	( <sup>2</sup> )486.0	21.87	3.96	17.91
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
8-10 <sup>2</sup> -6	NPK.....	745.0	1002.5	1070.0	( <sup>2</sup> )706.7	31.80	4.21	27.59
18-5 <sup>3</sup> -8	O.....							
17-4 <sup>3</sup> -15	NPK 2....	888.8	902.5	952.5	( <sup>2</sup> )634.0	28.53	4.71	23.82
18-(5 <sup>3</sup> +14 <sup>3</sup> )-8	O.....							
19-6 <sup>3</sup> -16	NPK 3....	792.5	917.5	855.0	( <sup>2</sup> )588.5	26.48	5.21	21.27

## EFFECT OF VARYING QUANTITIES OF FERTILIZER.

18-(5 <sup>3</sup> +14 <sup>3</sup> )-8 <sup>2</sup>	O.....					\$.....	\$.....	\$.....
20-7 <sup>3</sup> -1 <sup>2</sup> ( <sup>3</sup> )	½ (NPK)...	757.5	526.3	715.0	( <sup>2</sup> )402.4	18.11	2.11	16.00
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....							
8-10 <sup>2</sup> -6	NPK.....	745.0	1002.5	1070.0	( <sup>2</sup> )706.7	31.80	4.21	27.59
4 <sup>2</sup> -(5 <sup>3</sup> +14 <sup>3</sup> )-8 <sup>2</sup>	O.....							
1 <sup>2</sup> -8 <sup>3</sup> -2 <sup>2</sup>	1½ (NPK)	645.0	1242.3	1270.0	( <sup>2</sup> )858.2	38.62	6.32	32.30
2 <sup>2</sup> -9 <sup>3</sup> -3 <sup>2</sup>	2(NPK)...	746.3	1267.5	1390.0	( <sup>2</sup> )939.2	42.26	8.42	33.84
4 <sup>2</sup> -(5 <sup>3</sup> +14 <sup>3</sup> )-8 <sup>2</sup>	O.....							
3 <sup>2</sup> -10 <sup>3</sup>	2½ NPK	( <sup>1</sup> )1068.0	1349.8		( <sup>3</sup> )1053.1	47.39	10.53	36.86

(<sup>1</sup>) Detailed results are given in August, 1910, Bulletin of North Carolina State Department of Agriculture.

(<sup>2</sup>) These are the average of five years (1905-1909) results instead of seven as indicated.

(<sup>3</sup>) This average is for the years 1904, 1905, 1906, 1907 and 1909.

(<sup>4</sup>) Three times, 3(NPK) normal quantity of fertilizer applied in 1909.

## RESULTS WITH COTTON AT STATESVILLE.

*Effect of Nitrogen, Phosphoric Acid, Potash and Lime Alone and in Combination with each other on Cotton Yields.*—These experiments, the results of which are presented in Table VIII, were planned and carried out in the same general way as those with corn at the Central Farm, located at Raleigh.

Nitrogen, N (Plats 1, 3<sup>2</sup> and 1). The average results during six years on the plats in Fields A and B show decreased yields and value of product, while for one year in Field C there was a gain from the use of nitrogen, the average results for the plats in the three fields during the seven years being an actual loss in both yield and value of product from the application of nitrogen alone. The loss was \$2.84 annually.

Phosphoric Acid, P (Plats 2, 4<sup>2</sup> and 2). Phosphoric acid alone produced increased yields in all of the seven years on the plats in the three fields, the average increase for four years in Field A being 419.3 pounds of seed cotton; for two years in Field B 422.5 pounds; and for one year in Field C 570 pounds, or an average for the seven years in all three fields of 441.8 pounds, worth at 4½ cents per pound \$18.48 per acre annually over cost of fertilizer.

Potash, K (Plats 3, 6<sup>2</sup> and 3). From potash alone the average increased yields in the three fields were 65, 96.3 and 145 pounds of seed cotton respectively, or an average of 85.4 pounds for all three fields for the seven years, valued at \$3.34 annually over the cost of fertilizer.

Nitrogen and Phosphoric Acid, N P (Plats 5, 7<sup>2</sup> and 4). Nitrogen and phosphoric acid alone gave increased yields over the unfertilized plats for all seven years on the plats in the three fields, the annual average increase for the four years in Field A being 667.4 pounds; for two years in Field B 320.2 pounds; and for one year in Field C 330 pounds, or an average annual increase for seven years in three fields of 520.1 pounds, worth \$19.69 over the cost of fertilizer. This is \$1.21 more than the value of the increase produced by phosphoric acid alone, showing that nitrogen has added but little to the yield and profit over what phosphoric acid alone gave.

Nitrogen and Potash, N K (Plats 6, 8<sup>2</sup> and 5). From an application of nitrogen and potash combined there were small average increased yields on all plats in the three fields, the average for the seven years being 96.5 pounds of seed cotton, worth \$1.53 over cost of fertilizer, which is \$1.81 less than the average for potash alone.

Phosphoric Acid and Potash, P K (Plats 7, 9<sup>2</sup> and 12<sup>2</sup>). Phosphoric acid and potash combined gave increased yields on all the plats in the three fields, the average annual increase for four years results in Field A being 637.5 pounds; for two years in Field B 620.3 pounds; and for one year in Field C 465 pounds, or an average for the seven years results in the three fields of 608 pounds, worth \$25.46 over cost of fertilizer, which is \$6.98 more than the average value of increase from phosphoric acid alone.

Nitrogen, Phosphoric Acid, and Potash, N P K (Plats 8, 10<sup>2</sup> and 6). These three materials combined in a complete fertilizer gave increased yields in all the tests on all the plats in the three fields, the annual average increase for four years in Field A being 712.5 pounds of seed

cotton; for two years in Field B 696.9 pounds; and for one year in Field C 780 pounds, or an annual average increase per acre for the seven years in the three fields of 717.7 pounds, worth \$28.09 over the cost of fertilizer.

Lime L (Plats 14<sup>2</sup>, 4<sup>4</sup> and 7<sup>2</sup>). Lime was applied at the rate of 500 pounds of rock or 1,000 pounds slaked lime per acre every fourth year. On the plat in Field A during two years there was a profit of 50 cents per acre from the use of lime alone; on the plat in Field B in two years' experiments a loss of \$2.54 annually per acre; and on the plat in Field

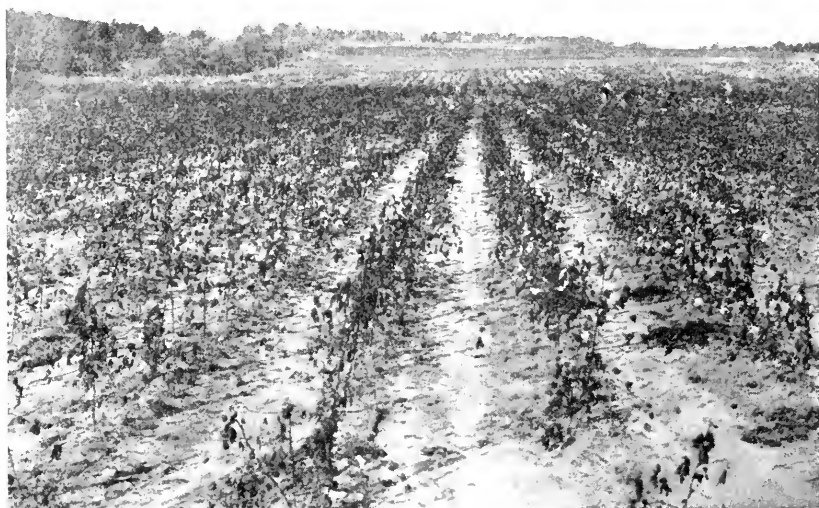


Fig. IX. Cotton in 1906 on Plat 6 (NK) of Field A at the Iredell Farm.

C in a one year's test a profit of \$7.02, or an average for the seven years of a net profit of 59 cents annually per acre.

Complete Fertilizer with Lime, N P K L (Plats 15<sup>2</sup>, 6<sup>4</sup> and 9<sup>2</sup>). Where lime was used in combination with the three fertilizer constituents there was less cotton produced on all the plats in all three of the fields than where the three fertilizer constituents were used without lime, showing a net loss in the use of lime in combination with a complete fertilizer for the production of cotton on this soil.

Taking the experiments as a whole, the average results show that nitrogen alone on this soil for the production of cotton was used at a loss;

Potash alone gave a small profit; nitrogen and potash combined gave less by practically one-half than potash alone;

Lime alone had very little effect on the yield;

Phosphoric acid alone gave a large increase in yield and profit

(practically two-thirds as large as nitrogen, phosphoric acid, and potash combined);

Nitrogen combined with phosphoric acid added but slightly to the increased yields;

Potash added to phosphoric acid gave profitable returns;

Nitrogen added to phosphoric acid and potash gave a small profit, and the yields from lime added to nitrogen, phosphoric acid, and potash were smaller than for the three fertilizer constituents combined.

The main increased yields and profits, therefore, came from phosphoric acid; the next most profitable constituent was potash, nitrogen being of no value except where used in combination with phosphoric acid and potash, and the profit from its use then was not large. It will be well to bear these facts in mind for comparison with the results presented in the tables to follow.

*Effect of Varying Quantities of Nitrogen.*—These tests were planned to determine the effect on the yield of cotton of varying quantities of nitrogen, leaving the phosphoric acid and potash constant. On one plat the nitrogen was reduced to one-half of the normal quantity, making the application 5 pounds of nitrogen per acre or practically 1.9 per cent in the fertilizer mixture. On two of the plats it was increased by 2 and 3 times the normal quantity (10 pounds per acre), making the application 20 and 30 pounds per acre respectively, or on the basis of the fertilizer mixture 5.3 and 6.6 per cent. The average results for four years on the plats in Field A show the largest yield and profit from the fertilizer application containing one-half the normal or the smallest quantity of nitrogen in the several mixtures. In two years' and one year's tests respectively, on Fields B and C, the largest profits were obtained from the plats receiving fertilizer application containing twice the normal quantity of nitrogen in the mixture, or 20 pounds of nitrogen per acre.

Taking the seven years' experiments together, the average results show an average increased yield over the unfertilized plats of 737 pounds of seed cotton, worth \$30.11 above the cost of fertilizer, the application containing one-half the normal quantity of nitrogen ( $N\frac{1}{2}$  P K), (this equals 5 pounds nitrogen per acre), and 777.5 pounds, worth \$28.47 for the fertilizer application containing twice the normal quantity of nitrogen. ( $N_2$  P K.) (This equals 20 pounds of nitrogen per acre.)

These results indicate that nitrogen is not the most important or controlling constituent for the production of cotton on this soil.

*Effect of Varying Quantities of Phosphoric Acid.*—This part of the experiments was planned to show the effect on the yields of seed cotton of varying quantities of phosphoric acid, the nitrogen and potash remaining the same. On one plat one-half the normal quantity of phosphoric acid was applied, or an amount represented by 87.5 pounds of 16 per cent acid phosphate and equivalent to  $6\frac{1}{2}$  per cent phosphoric acid in the fertilizer mixture. On two plats were applied two and three times the normal quantities of phosphoric acid, represented by 350 pounds and 525 pounds of 16 per cent acid phosphate respectively, or 56 and 84 pounds of phosphoric acid per acre. The yields show good profits for all of the fertilizer mixtures, in which phosphoric acid was

used. In Fields A and C the greatest increase in yield and profit per acre resulted from the N P K application; and in Field B the largest increase and profit was from the N P<sub>2</sub> K application.

The results on all of the fields as well as the averages, show that one-half the normal quantity of phosphoric acid is not sufficient for best returns. The largest average increased yield of seed cotton was from the heavy application of acid phosphate (525 pounds per acre) along with the normal quantities of potash and nitrogen, though the largest profit when cost of fertilizer is considered, was from the normal



Fig. X. Cotton in 1906 on Plat 21 (NPK) of Field A at the Iredell Farm. Contrast with growth shown in Fig. IX, where no phosphoric acid was applied. Produced almost eight times as great a yield of seed cotton as the NK application.

fertilizer application containing 200 pounds of acid phosphate. The experiments are being continued according to the same plan on these several fields, and the results from year to year will no doubt throw additional light on this as well as other phases of the problem of the best and most profitable fertilization for cotton.

*Effect of Varying Quantities of Potash.*—This portion of the experiments is designed to study the effect on the yield of seed cotton of varying quantities of potash, the nitrogen and phosphoric acid remaining constant. On one plat only one-half the normal quantity of potash was applied, or 1.8 per cent in the fertilizer mixture, or 5 pounds of potash per acre, while on two other plats two and three times the normal quantities were given, or 20 and 30 pounds of actual potash per acre respectively. On basis of the normal fertilizer mixture this would represent 5.7 and 7.5 per cent of potash in the mixture.

The results are quite uniform in all three of the fields, indicating that 1.8 per cent in the mixture, or 5 pounds of potash per acre, is not

sufficient for the most profitable yield of cotton on this soil, when used in connection with the regular quantities of nitrogen and phosphoric acid employed in the mixtures. The largest average increase in yield of cotton, as well as the greatest profit, was obtained from the plats receiving the normal quantity of potash, which was 3.3 per cent in the mixture, or 10 pounds to the acre. This quantity is supplied by 50 pounds of 20 per cent manure salt.

*Effect of Varying Quantities of Fertilizer.*—The results of the experiments show the effect of increasing and decreasing the normal (N P K equals 400 pounds of a fertilizer mixture containing 7 per cent



Fig. XI. Relative residual effects of applications of phosphoric acid and nitrogen on rye sown in 1911 in cotton after the first picking on Field B of the Iredell Farm.

phosphoric acid,  $2\frac{1}{2}$  per cent potash and  $2\frac{1}{2}$  per cent nitrogen) fertilizer application on the yields. The applications were at the rate of 200 pounds per acre ( $\frac{1}{2}$  N P K); 400 pounds per acre, N P K; 600 pounds per acre ( $1\frac{1}{2}$  N P K); 800 pounds per acre (2 N P K); 1,000 pounds per acre ( $2\frac{1}{2}$  N P K). The results on the several fields and the averages of the three fields are quite uniform in showing increased yields and increased profits for the several increases in the amounts of fertilizer, the quantity of fertilizer per acre varying from 200 to 1,000 pounds. The largest yield, as well as the greatest profit, were obtained from the 1,000-pound application. It is possible that the limit of the most profitable fertilization for cotton on this soil has not been reached, and that more than 1,000 pounds per acre would give remunerative returns. Additional experiments have been put out to test this, the quantity running up to 1,800 pounds per acre.

In addition to larger profits from heavy fertilization of the right kind, the land is in all probability improving in productiveness and value. Results on these plats and fields in after years will be most valuable in throwing light on this most important phase of the proper fertilization for immediate returns and for the permanent improvement of the soil. This latter phase of farm practice is not given the thought and consideration it should receive by most farmers.

Concise, the average results for five years' experiments with different quantities of fertilizers are as follows:

Pounds Fertilizer Per Acre	Average Yield Seed Cotton Per Acre, Pounds	Average Increase Per Acre Due to Fertilizer	Average Value of Increase at 4½ Cents Per Pound
200	656.5	402.4	\$ 16.00
400	912.9	706.7	27.59
600	1208.9	858.2	32.30
800	1083.5	939.2	33.84
1000	1180.9	1053.1	36.86

#### RESULTS WITH CORN AT STATESVILLE.

The experiments with corn at this farm, results of which are given in Table IX, are planned on the same general basis as those with this crop at the Central Farm. The data secured in the experiments is assembled and discussed in similar manner for both farms.

Nitrogen, N (Plats 1, 3<sup>2</sup> and 1). During six years the average results on the plats in Field A and B show decreased yields and in the value of product, while for one year in Field C there was a gain from the use of nitrogen, the average results for the plats in the three fields being an actual loss in both yield and value of product from the application of nitrogen alone. The average annual loss was \$1.97 per acre on basis of corn and stover and \$1.60 per acre on basis of corn alone.

Phosphoric Acid, P (Plats 2, 4<sup>2</sup> and 2). Phosphoric acid alone produced increased yields in all of the seven years on the plats in the three fields, the average increase for two years in Field A being 5 bushels for four years, in Field B 6.5 bushels of corn per acre, and for one year in Field C 7.4 bushels, or an average for seven years in all three fields of 6.2 bushels, worth at 80 cents per bushel \$4.96 per acre for corn alone, or \$5 for the increased yield of corn and stover over cost of fertilizer.

Potash, K (Plats 3, 6<sup>2</sup> and 3). Except the first year in Field B, there was less corn produced on the plats receiving potash alone than on the unfertilized plats, the average for the seven years being slightly less where potash was used than where no fertilizer was applied, and the potash was used at loss.

Nitrogen and Phosphoric Acid N P (Plats 5, 7<sup>2</sup> and 4). From nitrogen and phosphoric acid increased yields over the unfertilized plats were obtained in all seven years in the three fields, the average annual increase for two years results in Field A being 22.4 bushels of corn per acre; for the four years results in Field B 17.5 bushels of corn per acre; and for one year in Field C 16.3 bushels, or an average the annual increase for seven years results in the three fields of 18.8 bushels of corn worth \$11.91 over cost of fertilizer for corn alone, or \$16.42 for the increased yield of corn and stover. This was 12.6 bushels more corn, worth \$10.08, than phosphoric acid alone produced, showing that nitrogen has added decidedly to the yield and profit when combined with phosphoric acid, though alone it was used at a loss.



TABLE IX.—RESULTS WITH CORN ON FIELDS A, B, AND C AT THE IREDELL TEST FARM.<sup>1</sup>

Plat No.	Treat-ment.	Average Yield per Acre						Average Increase Due to Different Fertilizer Treatments		Value of Increase with Corn at \$0.80 per Bushel, and Stover at \$10.00 per Ton	Cost of Fertilizer per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer
		For Field A (In 1905 and 1907)		For Field B (In 1903, '04, '06, and '08)		For Field C (In 1909)						
		Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.			
4-5 <sup>2</sup> -8	O.....											
1-3 <sup>2</sup> -1	N.....	15.1	1653	21.0	1634	26.5	2140	0.6	-73	0.11	2.08	-1.97
2-4 <sup>2</sup> -2	P.....	23.4	1825	26.4	2044	27.4	2192	6.2	218	6.05	1.05	5.00
4-(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....											
3-6 <sup>2</sup> -3	K.....	15.5	1518	21.0	1736	19.7	1490	0.1	-113	-0.49	0.23	-0.26
(4+11)-(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....											
5-7 <sup>2</sup> -4	NP.....	40.1	2983	36.7	2469	36.3	2590	18.8	901	19.55	3.13	16.42
6-8 <sup>2</sup> -5	NK.....	20.2	1768	18.6	1764	21.2	2014	1.5	151	1.96	2.31	-0.35
(4+11)-(5 <sup>2</sup> +14 <sup>2</sup> )-8 <sup>2</sup>	O.....											
7-9 <sup>2</sup> -12 <sup>2</sup>	PK.....	37.4	2905	32.4	2383	23.8	2420	16.5	1015	18.28	1.28	17.00
(4+11)-(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....											
8-10 <sup>2</sup> -6	NPK.....	37.7	2888	34.3	2413	38.7	2902	19.1	1069	20.63	3.36	17.27
18 <sup>2</sup> -5 <sup>4</sup> -8 <sup>2</sup>	O.....											
14 <sup>2</sup> -4 <sup>1</sup> -7 <sup>2</sup>	L.....	19.0	1805	13.5	1223	21.1	1600	-1.47	-42	-1.39	0.63	-2.02
15 <sup>2</sup> -6 <sup>4</sup> -9 <sup>2</sup>	NPKL.....	36.9	2783	29.8	1863	39.7	2460	14.2	726	14.99	3.99	11.00

## EFFECT OF VARYING QUANTITIES OF NITROGEN.

(4+11)-												
(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....									\$.....	\$.....	\$.....
9-11 <sup>2</sup> -7	N ½ PK...	34.3	2033	34.6	2421	42.1	3000	19.5	893	20.07	2.32	17.75
8-10 <sup>2</sup> -6	NPK.....	37.7	2888	34.3	2413	38.7	2902	19.1	1069	20.63	3.36	17.27
10-12 <sup>2</sup> -9	N 2 PK...	38.3	2519	38.4	2781	48.5	3080	24.2	1300	25.86	5.44	20.42
12-13 <sup>2</sup> -10	N 3 PK...	41.8	2828	38.6	2651	45.8	2460	25.6	1275	26.86	7.52	19.34

## EFFECT OF VARYING QUANTITIES OF PHOSPHORIC ACID.

18-14 <sup>2</sup> -8	O.....									\$.....	\$.....	\$.....
13-15 <sup>2</sup> -11	NP ½ K...	36.7	3008	30.1	2261	32.7	2130	12.7	871	14.52	2.84	11.68
(4+11)-												
(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....											
8-10 <sup>2</sup> -6	NPK.....	37.7	2888	34.3	2413	38.7	2902	19.1	1069	20.63	3.36	17.27
18-5 <sup>3</sup> -8	O.....											
14-1 <sup>3</sup> -12	NP 2 K...	36.4	3098	28.2	2298	33.6	2470	12.0	758	13.39	4.41	8.98
15-2 <sup>3</sup> -13	NP 3 K...	38.5	3105	25.9	2425	31.2	2340	10.94	814	12.82	5.46	7.36

TABLE IX.—Continued.

## EFFECT OF VARYING QUANTITIES OF POTASH.

Plat No.	Treat-ment	Average Yield per Acre						Average Increase Due to Different Fertilizer Treatments		Value of Increase with Corn at \$0.80 per Bushel, and Stover at \$10.00 per Ton	Cost of Fertilizer per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer
		For Field A (In 1905 and 1907)		For Field B (In 1903, '04, '06, and '08)		For Field C (In 1909)						
		Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.	Corn, Bus.	Stover, Lbs.			
18-5 <sup>3</sup> -8	O.....											
16-3 <sup>3</sup> -14	NPK ½.....	33.8	2595	26.0	2120	27.4	2055	9.1	453	\$ 9.55	\$ 3.25	\$ 6.30
(4+11)-												
(5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....											
8-10 <sup>2</sup> -6	NPK.....	37.7	2888	34.3	2413	38.7	2902	19.1	1069	20.63	3.36	17.27
18-(5 <sup>3</sup> +14 <sup>3</sup> )-8	O.....											
17-4 <sup>3</sup> -15	NPK 2.....	33.8	2940	26.1	2301	27.5	2062	9.2	703	10.88	3.59	7.29
19-6 <sup>3</sup> -16	NPK 3.....	41.6	4013	24.2	2065	28.3	2120	10.67	882	12.95	3.82	9.13

## EFFECT OF VARYING QUANTITIES OF FERTILIZER.

18-(5 <sup>3</sup> + 14 <sup>3</sup> )-8 <sup>2</sup>	O.....											
20-7 <sup>3</sup> -1 <sup>2</sup>	½ (NPK).....	36.5	2998	21.2	1908	25.0	1940	8.6	599	\$ 9.88	\$ 1.68	\$ 8.20
(4+11)- (5 <sup>2</sup> +14 <sup>2</sup> )-8	O.....											
8-10 <sup>2</sup> -6	NPK.....	37.7	2888	34.3	2413	38.7	2902	19.1	1069	20.63	3.36	17.27
4 <sup>2</sup> -(5 <sup>3</sup> + 14 <sup>3</sup> )-8 <sup>2</sup>	O.....											
1 <sup>2</sup> -8 <sup>3</sup> -2 <sup>2</sup>	1½ (NPK).....	33.5	2448	39.0	3094	32.7	2452	24.1	1499	26.78	5.04	21.74
2 <sup>2</sup> -9 <sup>3</sup> -3 <sup>2</sup>	2 (NPK).....	29.9	2490	34.3	2609	33.6	2270	20.8	1254	22.91	6.72	16.19
4 <sup>2</sup> -(5 <sup>3</sup> + 14 <sup>3</sup> )-8 <sup>2</sup>	O.....											
3 <sup>2</sup> -10 <sup>3</sup>	3(NPK)(?).....	40.7	3143	41.3	3394	-----	-----	28.3	2068	32.98	10.08	22.90

<sup>1</sup> Detailed results are given in September, 1910, Bulletin of North Carolina State Department of Agriculture.

<sup>2</sup> In 1908 a 2½ (NPK) application of Fertilizer was made instead of a 3 (NPK) one as indicated

Nitrogen and Potash N K (Plats 6, 8<sup>2</sup> and 5). There were small average increased yields of corn in the three fields from applications of nitrogen and potash combined, the average for the seven years in the three fields being 1.5 bushels per acre, which was not sufficient to pay for the fertilizer. This fertilization was therefore at a loss, having cost 35 cents per acre more annually than the value of the increased yield of corn and stover.

Phosphoric Acid and Potash, P K (Plats 7, 9<sup>2</sup> and 12<sup>2</sup>). Phosphoric acid and potash combined gave increased yields on all the plats in the

three fields, the average annual increase for two years in Field A being 21 bushels; for four years in Field B 15.2 bushels of corn per acre; and for one year in Field C 12.5 bushels, or an average for the seven years in the three fields of 16.5 bushels, worth \$11.92 over cost of fertilizer on basis of corn alone, or \$17 on basis of corn and stover. From this it is seen that potash added to phosphoric acid has increased the yield of corn 10.3 bushels more than phosphoric acid alone, at a profit of \$8.01 over cost of fertilizer, showing that potash was effective in corn production on this soil when used in connection with phosphoric acid, but valueless when used alone.

Nitrogen, Phosphoric Acid and Potash, N P K (Plats 8, 10<sup>2</sup>, and 6). When all three of the fertilizer materials were used together to make a



Fig. XII. Corn in 1911 on Field B at the Iredell Farm. Complete fertilizer on left. Yield of grain was 127 times as great on Plat 15 (NPK) as on Plat 14 (O).

complete fertilizer, increased yields were obtained on all three plats in the three fields, the average annual increase for two years in Field A being 21.9 bushels; for four years in Field B 17.8 bushels of corn per acre; and for one year in Field C 18.7 bushels, or an annual average increase for the seven years in the three fields of 19.1 bushels, worth \$11.92 over cost of fertilizer on basis of corn alone, or \$17.27 on basis of corn and stover.

When compared with each other these results show that nitrogen added to phosphoric acid, potash added to phosphoric acid, and nitrogen and potash added to phosphoric acid have yielded practically the same profits, though nitrogen and phosphoric acid have produced largest average increased yields over unfertilized plats (18.8 bushels per acre), than phosphoric acid and potash (16.5 bushels per acre), and nitrogen, phosphoric acid and potash were larger than either of the other two

(19.1 bushels per acre). This indicates that nitrogen is more important on this soil than potash for corn production.

Lime, L (Plats 14<sup>2</sup>, 4<sup>4</sup> and 7<sup>2</sup>). Lime was applied at the rate of 500 pounds rock or 1,000 pounds slaked lime per acre every fourth year. On the plat in Field A there was a loss of \$12.29 annually per acre, and on the plat in Field C in one year's test a profit of \$9.56, the average for the seven years being a loss of \$2.02 per acre. On the plat in Field B during four years there was a profit of 25 cents per acre from the use of lime. The plat in Field C, where there was a profit from the use of lime, had been in peas after grain during four previous years.

Complete Fertilizer with Lime, N P K L (Plats 15<sup>2</sup>, 6<sup>4</sup> and 9<sup>2</sup>). When lime was used in combination with the three fertilizer constituents there was less corn produced on all the plats in Fields A and B than where the three fertilizer constituents were used without lime, but on the plat in Field C, which had previously been in peas and grain for four years, there was a decided gain from the use of lime. As an average of all the tests there was a smaller increased yield of corn and profit where lime was used than where it was not.

As an average of all the results, the experiments show:

(1) That nitrogen alone on this soil for the production of corn was used at a loss;

(2) That potash alone had practically no effect on the yield and was used at a loss;

(3) That nitrogen and potash combined increased the yield very slightly but at a loss;

(4) That lime alone, except where peas had been previously grown, was used at a loss;

(5) That phosphoric acid alone gave increased yields and profits in all cases, showing that it is the most important constituent for corn production on this soil;

(6) That nitrogen combined with phosphoric acid added decidedly to the increased yields and profits, the average annual increase for phosphoric acid alone being 6.2 bushels and for nitrogen and phosphoric acid 18.8 bushels per acre;

(7) That potash added to phosphoric acid increased the yields decidedly over phosphoric acid alone, the average annual increase for phosphoric acid alone being 6.2 bushels per acre, and for phosphoric acid and potash 16.5 bushels;

(8) That potash added to nitrogen and phosphoric acid resulted in a small increase in yield and without profit; and

(9) That the yields from the addition of lime to nitrogen, phosphoric acid and potash were smaller than from the three fertilizer constituents combined.

The most important constituent in producing increased yields and profits on this soil was phosphoric acid. Nitrogen and potash singly or combined, gave good returns when used with phosphoric acid, but were of little or no value when used alone or with each other. Nitrogen added more largely to the yields than did potash.

*Effect of Varying Quantities of Nitrogen.*—The results of the portion of the experiments devoted to a study of the effect on the yield of corn and stover of varying quantities of nitrogen, leaving the phos-

phoric acid and potash constant, is given in the second section of Table IX. In these experiments, on one plat the nitrogen was reduced to one-half the normal quantity, making the application  $4\frac{1}{2}$  pounds of nitrogen per acre, or 2.4 per cent in the amount of fertilizer mixture used; and on two of the plats it was increased by two and three times the normal quantity (9 pounds per acre), making the application 18 and 27 pounds per acre respectively, or on the four plats  $4\frac{1}{2}$ , 9, 18 and 27 pounds of nitrogen per acre.

The average results for two years in Field A showed the largest yields and profit to have come from the application containing three times the normal quantity of nitrogen, or 27 pounds nitrogen per acre, the average yield of corn being 41.8 bushels per acre, and the profit \$14.88 over cost of fertilizer, on basis of corn alone, or \$21.90 on basis of corn and stover. For four years in Field B the largest profit was secured from the application containing twice the normal quantity of nitrogen per acre, or 18 pounds of nitrogen, the average yield being 38.4 bushels corn per acre, and the profit \$13.04 over cost of the fertilizer on basis of corn alone or \$20.05 on basis of corn and stover. In one year in Field C twice the normal quantity of nitrogen gave the best returns, the yield of corn being 48.5 bushels, and the profit \$17.36 over cost of the fertilizer on basis of corn alone and \$24.41 on basis of corn and stover. As an average for the seven years 18 pounds of nitrogen per acre (twice the normal quantity) gave the largest profits, though 27 pounds of nitrogen gave slightly the largest increase in yield of corn.

These results emphasize the importance of nitrogen for the production of corn on this soil when applied in connection with the proper amount of phosphoric acid and some potash.

The fertilizer application which gave best results in these tests ( $N_2$  P K) cost \$5.44 per acre and yielded a profit of \$13.92 over cost of fertilizer, on basis of corn alone, or \$20.42 on basis of corn and stover. The average yield of corn during the seven years from this fertilization was 39.8 bushels of corn per acre. The yield without fertilizer was 15.6 bushels per acre, or an annual average increase of 24.2 bushels per acre due to fertilizer. Without fertilizer the land lost rapidly in productiveness, while with the larger quantities of nitrogen (18 and 27 pounds per acre) there were larger yields in after years than in the first year, the average for the entire seven years being larger than for the first year.

*Effect of Varying Quantities of Phosphoric Acid.*—The results under this title in Table IX show the effect on yields of corn and stover of varying quantities of phosphoric acid, the nitrogen and potash remaining the same. On one plat one-half the normal quantity of phosphoric acid was applied or an amount represented by 65.5 pounds of 16 per cent acid phosphate and equivalent to  $3\frac{1}{2}$  per cent phosphoric acid in the fertilizer mixture. On two plats were applied two and three times the normal quantities of phosphoric acid represented by 263 and 394 pounds of 16 per cent acid phosphate respectively, or 42 and 63 pounds of phosphoric acid per acre. The results in all the fields show increased yields and profits for all the quantities of phosphoric acid, but the largest yields, increases and profits in all the fields were from the plats receiving the normal quantity of phosphoric acid

or 131 pounds of 16 per cent acid phosphate, which is equal to 21 pounds of phosphoric acid per acre. Larger quantities than the above of phosphoric acid did not add to the yields of corn when the quantities of nitrogen and potash remained the same.

*Effect of Different Quantities of Potash.*—The potash experiments show the effect on the yield of corn and stover of varying quantities of potash, the nitrogen and phosphoric acid remaining constant. On one plat only one-half the normal quantity of potash was applied or 1.1 per cent in the fertilizer mixture, or 2.25 pounds of potash per acre. On two other plats two and three times the normal quantities were given, or 9 and 13.5 pounds per acre respectively. This would make the application of potash on the several plats 2.25, 4.5, 9, and 13.5 pounds. The results in all of the fields are uniform in showing that the larger quantities were not as profitable as the normal amount,  $1\frac{1}{2}$  per cent in the fertilizer mixture, or  $4\frac{1}{2}$  pounds per acre. Neither was a very small quantity,  $\frac{3}{4}$  per cent in the fertilizer mixture, or 2.25 pounds per acre, as profitable or as effective in increasing yields as the normal quantity.

The indications are that  $1\frac{1}{2}$  per cent of potash is all that is needed for corn in this soil when used in connection with the regular quantities of nitrogen and phosphoric acid in the normal corn mixture.

The results further throw light on the comparative values of nitrogen and potash for corn on this soil and give unquestionably a more important place to nitrogen than potash.

*Effect of Varying Quantities of Fertilizer.*—The results in the lower section of Table IX show the effect of increasing and decreasing the normal fertilizer application on yields, the normal (N P K) being 300 pounds of a mixture containing 7 per cent phosphoric acid, 3 per cent nitrogen and  $1\frac{1}{2}$  per cent potash. The applications were at the rate of 150 pounds per acre ( $\frac{1}{2}$  N P K); 300 pounds per acre (N P K); 450 pounds per acre ( $1\frac{1}{2}$  N P K); 600 pounds per acre (2 N P K); 900 pounds per acre (3 N P K). The results in all the fields show increased yields and profits for all the quantities of fertilizer. The amount of fertilizer varied from 150 to 900 pounds per acre. During two years in Field A the largest profit was from 300 pounds of the fertilizer mixture per acre, the average yield being 37.7 bushels per acre, at a profit of \$14.16 over cost of fertilizer on the basis of corn alone, or \$20.67 on the basis of corn and stover. During four years in Field B 450 pounds of fertilizer gave the largest profit, the yield of corn being 39 bushels per acre, this being 27.3 more than was yielded by the unfertilized plat. The profit per acre from this application on this field was \$16.80 on the basis of corn alone, or \$25.37 on the basis of value of both corn and stover. From one year's results in Field C, the largest increase in yield and profit resulted from an application of 450 pounds of the normal fertilizer mixture per acre.

#### RESULTS WITH COWPEAS AT STATESVILLE.

An examination of the yields on the plats in Field C given in Table X will show that there was a decrease in yields for each of the four years. This is due, in part, to weather conditions and time of planting. In 1904 the pea crop had the land throughout the entire growing season and without the draft of a previous crop on the available plant food

TABLE X.—RESULTS WITH COWPEAS ON FIELDS A AND C AT THE IREDELL TEST FARM.<sup>(1)</sup>

Plat No.	Treat-ment	Average Yield per Acre				Average Increase Due to Different Fertilizer Treatments		Value of Increase with Peas at \$1.75 per Bushel, and Hay at \$18.00 per Ton	Cost of Fertilizer per Acre	Value of Average Annual Increase of Peas and Hay Over Cost of Fertilizer
		For Field A (In 1908)		For Field C (In 1904, '05, '06, and '07)		Peas, Bus.	Hay, Lbs.			
		Peas, Bus.	Hay, Lbs.	Peas, Bus.	Hay, Lbs.					
4-8	O.....							\$.....	\$.....	\$.....
1-1	N.....	3.0	400	8.9	2215	—1.1	380	1.50	0.69	0.81
2-2	P.....	7.9	2100	12.3	2460	2.6	916	12.79	1.20	11.59
3-3	K.....	1.4	400	10.1	2080	—0.5	272	1.57	0.60	0.97
(4+11)-8	O.....									
5-4	NP.....	9.8	2200	13.4	2200	3.9	728	13.38	1.89	11.49
6-5	NK.....	1.8	900	10.3	2033	—0.1	334	2.83	1.29	1.54
(4+11)-8 <sup>2</sup>	O.....									
7-12 <sup>2</sup>	PK.....	9.0	2300	12.1	2720	3.4	1052	15.42	1.80	13.62
(4+11)-8	O.....									
8-6	NPK.....	8.3	2200	12.9	2702	3.4	1130	16.12	2.49	13.63
11-8 <sup>2</sup>	O.....									
14-7 <sup>2</sup>	L.....	1.2	400	11.1	2325	1.3	356	5.48	0.63	4.85
18-8 <sup>2</sup>	O.....									
15-9 <sup>2</sup>	NPKL.....	8.2	2200	15.1	2920	5.7	1212	20.88	3.12	17.76

## EFFECT OF VARYING QUANTITIES OF NITROGEN.

(4+11)-8	O.....							\$.....	\$.....	\$.....
9-7	N ½ PK..	9.5	2200	13.7	2763	4.3	1178	18.13	2.14	15.99
8-6	NPK.....	8.3	2200	12.9	2702	3.4	1130	16.12	2.49	13.63
10-9	N 2 PK...	9.2	2300	14.7	2978	5.1	1370	22.26	3.18	19.08
11-8	O.....									
12-10	N 3 PK...	8.2	2200	15.1	3195	5.3	1524	22.99	3.87	19.12

## EFFECT OF VARYING QUANTITIES OF PHOSPHORIC ACID.

11-8	O.....							\$.....	\$.....	\$.....
13-11	NP ½ K...	6.3	2100	10.2	2102	1.0	630	7.42	1.89	5.53
(4+11)-8	O.....									
8-6	NPK.....	8.3	2200	12.9	2702	3.4	1130	16.12	2.49	13.63
11-8	O.....									
14-12	NP 2 K...	7.5	2800	15.8	3045	5.7	1524	23.69	3.69	20.00
15-13	NP 3 K...	14.0	3200	14.9	3080	6.3	1632	25.71	4.89	20.82

TABLE X.—Continued.

## EFFECT OF VARYING QUANTITIES OF POTASH.

Plat No.	Treat-ment	Average Yield per Acre				Average Increase Due to Different Fertilizer Treatments		Value of Increase with Peas at \$1.75 per Bushel, and Hay at \$18.00 per Ton	Cost of Fertilizer per Acre	Value of Average Annual Increase of Peas and Hay Over Cost of Fertilizer
		For Field A (In 1908)		For Field C (In 1904, '05, '06, and '07)		Peas, Bus.	Hay, Lbs.			
		Peas, Bus.	Hay, Lbs.	Peas, Bus.	Hay, Lbs.					
18-8	O.....							\$.....	\$.....	\$.....
16-14	NPK ½.....	8.3	2200	10.6	2448	1.2	886	10.07	2.19	7.88
(4+11)-8	O.....									
8-6	NPK.....	8.3	2200	12.9	2702	3.4	1130	16.12	2.49	13.63
18-8	O.....									
17-15	NPK 2.....	8.4	2500	11.4	2275	1.9	808	10.60	3.09	7.51
19-16	NPK 3.....	13.8	1900	11.5	2485	3.1	856	13.13	3.69	9.44

## EFFECT OF VARYING QUANTITIES OF FERTILIZER.

18-8 <sup>2</sup>	O.....							\$.....	\$.....	\$.....
20-1 <sup>2</sup>	½ NPK.....	4.9	2200	( <sup>3</sup> )13.5	1935	1.9	364	6.60	1.24	5.36
(4+11)-8	O.....									
8-6	NPK.....	8.3	2200	( <sup>3</sup> )14.8	2702	3.7	1130	16.65	2.49	14.16
42-8 <sup>2</sup>	O.....									
12-2 <sup>2</sup>	1½ (NPK)	8.8	2200	( <sup>3</sup> )16.8	2675	6.0	996	19.46	3.73	15.73
22-3 <sup>2</sup>	2 (NPK)...	10.7	2900	( <sup>3</sup> )18.7	3020	7.9	1412	26.53	4.98	21.55
32-	3 (NPK)...	10.8	2800	( <sup>2</sup> )	( <sup>2</sup> )	10.0	2400	39.10	7.47	31.63

(1) Detailed results are given in June, 1910, Bulletin of North Carolina Department of Agriculture.

(2) Three times normal application added only one year and this to Field A, Plat 3<sup>2</sup>.

(3) Average for three years (1904-'05 and '06).

in the soil. After 1904 a grain crop preceded the pea crop, a crop of each being produced each year. It may be possible that the land was tired of peas, or that it was "pea-sick," as is now and then spoken of in connection with other crops. The inference that such was the case would be very strong were it not for the other conditions influencing the yields, which have already been referred to, and which must be considered. That the land is really in better condition for growing other crops is shown by the yields of cotton and corn on these plats, they having been in cotton in 1908 and corn 1909. The results of these two crops on plats having the same fertilization show greater increases over unfertilized plats than were obtained on the plats where corn and cotton have been grown in rotation with each other, and where the type of soil is the same.

The experiments were planned to cover the culture and fertilization of the cowpea as a whole, but the results of the several subdivisions or phases of the subject are grouped in short sections in the table to facilitate examination and the drawing of conclusions.



*Effect of Nitrogen, Phosphoric Acid, Potash and Lime Alone and in Combinations.*—These experiments were planned to test the effect on yield of nitrogen (N), phosphoric acid (P), and potash (K) when applied singly; when two of the constituents were applied together, as nitrogen and phosphoric acid (N P), nitrogen and potash (N K), and phosphoric acid and potash (P K), and when all three of the fertilizing constituents were applied to make a complete fertilizer (N P K). Lime (L) alone and with a complete fertilizer (N P K L) is also studied.

The results are shown in average yields of hay in pounds and peas in bushels per acre for the several years, and average increases over the unfertilized (O) plats, which represent the effect of the fertilizer applications, the value of the increase, the cost of the fertilizer, and the value of the increased yield over cost of fertilizer.

#### EFFECT ON YIELDS OF HAY.

Nitrogen, N (Plats 1 and 1). From nitrogen alone in Field C there were increased yields of hay in 1904 and 1905 and decreases in 1906 and 1907 over the unfertilized plat (8), the average increase being 475 pounds, while in 1908 in Field A the plat (1) receiving nitrogen and the unfertilized plat (4) produced the same yield. Plat 1 had had an application of nitrogen alone in corn and cotton tests during the previous six years and plat 4 had had no fertilizer during the same time.

Phosphoric Acid, P (Plats 2 and 2). Phosphoric acid alone produced increased yields in all of the five years on the plats in both fields, the average for the first four years being 720 pounds of hay, and for the fifth year in Field A 1,700 pounds, worth at \$18 per ton respectively \$5.28 and \$14.10 over the cost of fertilizer.

Potash, K (Plats 3 and 3). From potash alone in Field C the yields increased in 1904, 1905, and 1907, and decreased in 1906, the average annual increase being 340 pounds of hay. In Field A there was no increase due to potash in 1908 and the fertilizer application was used at a loss.

Nitrogen and Phosphoric Acid, N P (Plats 4 and 5). Nitrogen and Phosphoric acid combined gave increased yields over the unfertilized plats in all five years on the plats in both fields, the annual average for the first four years in Field C being 460 pounds of hay (less than for phosphoric acid alone, which was 720 pounds). For the fifth year (1908) in Field A the increase was 1,800 pounds, or 100 pounds more than the phosphoric acid alone gave.

Nitrogen and Potash N K (Plats 5 and 6). From the application of nitrogen and potash combined the yields were increased in three years and gave the same yield in one year in Field C, the average increase for the four years being 292 pounds of hay, the smallest increase from any of the applications in the test. In Field A in 1908 there was a gain of 500 pounds of hay, due to nitrogen and potash.

Phosphoric Acid and Potash, P K (Plats 12<sup>2</sup> and 7). Phosphoric acid and potash combined produced increased yields of hay in all five years of the tests on the plats in both fields over the unfertilized plats, the annual average increase for the first four years in Field C being 840 pounds per acre (120 pounds more than phosphoric acid alone),

and for the fifth year (1908) in Field A 1,900 pounds (200 pounds more than phosphoric acid alone), valued over the cost of fertilizer respectively at \$5.76 and \$15.30 per acre.

Nitrogen, Phosphoric Acid and Potash, N P K (Plats 6 and 8). These three materials combined in a complete fertilizer gave increased yields in all of the tests on all the plats, the annual average increase for the four years in Field C being 962 pounds of hay and for the fifth year in Field A 1,800 pounds. The net value of the increase (value over the cost of fertilizer) was \$6.17 in Field C and \$13.71 in Field A, or 89 cents more than phosphoric acid in Field C and 39 cents less in Field A.

For the production of hay these experiments, as a whole, show that phosphoric acid (Acid phosphate) produced the increased yields and that nitrogen and potash had very little effect, and in a number of tests none at all.

Lime alone, L (plats 7<sup>2</sup> and 14). On the Plat in Field C lime alone gave a profitable yield of pea-vine hay in the four years' test, the average increase being worth \$3.38 per acre. On the plat in Field A in one year's test there was no increase in yield over the unfertilized plat, and the lime was therefore used at a loss.

Complete Fertilizer with Lime, N P K L (Plats 9<sup>2</sup> and 15). Where lime was used in combination with the three fertilizer constituents there was a slight increase over what the complete fertilizer alone gave, but not sufficient to make the profit any greater than was obtained from the three fertilizer constituents by themselves.

Taken as a whole, lime was of doubtful value in increasing the yield of pea-vine hay.

#### EFFECT ON YIELD OF PEAS.

The yields of peas given in Table X for the singles and combinations were obtained on the same plats as the hay, the hay being cut on one-half of each plat and the peas gathered on the other half.

Nitrogen, N (Plats 1 and 1). After the first year (1904) nitrogen alone gave no material increase in the yield of peas; in two years (1906 and 1907) there was a decided decrease.

Potash, K (Plats 3 and 3). Potash alone did not increase the pea yields, the net result being a small loss in yields and the loss of the cost of the fertilizer application.

Nitrogen and Potash, N K (Plats 5 and 6). Nitrogen and potash combined did not help the yield of peas, and the cost of the fertilizer was lost.

Phosphoric Acid, P (Plats 2 and 2). Phosphoric acid alone gave an annual average increase of 2 bushels of peas per acre for the four years' test in Field C and 5 bushels for the fifth year in Field A.

Nitrogen and Phosphoric Acid, N P (Plats 4 and 5). Nitrogen and phosphoric acid combined increased the yield of peas in each of the tests, the annual average for the four years in Field C being 3.1 bushels, and for the fifth year in Field A 7.2 bushels. These were the largest and most profitable increases obtained from any of the fertilizer applications.

Phosphoric Acid and Potash, P K (Plats 12<sup>2</sup> and 7). From phos-

phoric acid and potash together there was an average annual increase of 2.5 bushels peas per acre for the four years in Field C, and 7 bushels for one year in Field A.

Nitrogen, Phosphoric Acid and Potash, N P K (Plats 6 and 8). These three materials in a complete fertilizer produced an average increase of 2.6 bushels for the four years in Field C, the main increase being the first two years, and 6.6 bushels for the fifth year in Field A. The yields above were a little less than where nitrogen and phosphoric acid alone were combined, showing that potash, whether used alone or with other materials, has not added to the production of peas.

Lime alone, L (Plats 7<sup>2</sup> and 14). On the plat in Field C lime alone on an average gave an increased yield in peas worth \$2 above the cost of the lime. On the plat in Field A as a result of one year's test there was a loss of 3 cents per acre.

Complete Fertilizer with Lime, N P K L (Plats 9<sup>2</sup> and 15). On the plats in one field there was a small increased yield from the use of lime in connection with a complete fertilizer, while on the plats in the other field the yield was practically the same where lime was used and where it was not. On an average, the lime used with complete fertilizer gave a greater profit per acre by \$3.38 than did the use of the complete fertilizer alone.

The same fertilizers have not increased the yield of peas in the same proportion they did hay. Phosphoric acid was the most important constituent, whether used alone or in combinations; nitrogen with phosphoric acid was helpful; nitrogen alone, potash alone, and nitrogen and potash combined were used at a loss.

*Effect of Varying Quantities of Nitrogen.*—This part of the experiments was planned to determine the effect on the yield of hay of varying quantities of nitrogen, leaving the phosphoric acid and potash constant. On one plat the nitrogen was reduced by one-half, making the application 1½ pounds of nitrogen per acre, or 0.7 per cent in the fertilizer mixture. On two other plats it was increased by two and three times the normal quantity, or 6 and 9 pounds per acre respectively, representing 3.2 per cent of nitrogen in the fertilizer mixture in the highest application.

#### EFFECT ON YIELD OF HAY.

The results during the first four years on plats in Field C showed a profitable increase in the yields of hay from increased quantities of nitrogen, the average profit for the four years from the heaviest application of nitrogen with constant amounts of phosphoric acid and potash being \$9.23 over the cost of the fertilizer application, or \$3.95 more than an application of phosphoric acid alone gave, and \$3.48 more than potash and phosphoric acid gave. For the one year's results on the plats in Field A the results showed no increase in yields of hay from increased quantities of nitrogen. The most profitable yield on these plats was from the plat receiving one-half the normal quantity of nitrogen, and the yield on this plat was less profitable than that obtained from phosphoric acid alone. The yield on plat 12 of Field A receiving the highest application of nitrogen, was less profitable than that on the plats receiving phosphoric acid alone and phosphoric acid and potash, by \$1.77 and \$2.97 respectively. The losses on these plats were very close to the gains on the plats in Field C.

The four years' experiments, represented on these latter plats, taking the results as a whole, show some profit, as is shown in the yield of hay from the increased quantities of nitrogen, though it is small over the profits produced by phosphoric acid alone.

#### EFFECT ON YIELD OF PEAS.

The experiments were intended, as were those with hay, to show the effect of varying quantities of nitrogen on the yield of peas, the phosphoric acid and potash remaining constant. The results show that the most profitable yields on the plats in both fields were where one-half the quantity of nitrogen was applied, or 0.7 per cent in the fertilizer mixture, and the profits on these plats were but slightly in excess of those where phosphoric acid alone and where phosphoric acid and potash were applied. The large application of nitrogen gave less profitable yields than phosphoric acid alone.

On the whole, the results in the production of peas are unfavorable to the application of nitrogen. Taking the results as a whole and considering the value of the peas and hay together the heavier applications of nitrogen yielded the greatest profit per acre above the cost of fertilizer.

*Effect of Varying Quantities of Phosphoric Acid.*—This part of experiments was planned to show the effect on the yield of hay and peas of varying quantities of phosphoric acid, the nitrogen and potash remaining constant. On one plat one-half the normal quantity of phosphoric acid was applied, or a quantity represented by 75 pounds of 16 per cent acid phosphate, an equivalent to 12 pounds of phosphoric acid. To two plats were applied two and three times the normal quantities of phosphoric acid represented by 300 and 450 pounds of 16 per cent acid phosphate respectively, or 48 and 72 pounds of phosphoric acid per acre.

#### EFFECT ON YIELD OF HAY.

The results on the plats in both fields in all the years show with marked unanimity decided increases in the yields of hay for increased quantities of phosphoric acid. On an average, increasing the application of 16 per cent acid phosphate from 75 pounds to 450 pounds, used with 23 pounds of blood and 60 pounds of manure salt, gave an increase of 1,002 pounds per acre worth \$9.02 at a cost of \$3 for the increase. The most profitable yield on the plats in Field C was from the plat receiving two quantities phosphoric acid or the equivalent of 300 pounds of 16 per cent acid phosphate per acre, while the most profitable return from the plats in Field A is from the one having three quantities of phosphoric acid or the equivalent of 450 pounds acid phosphate per acre, the profit in these cases being \$8.06 and \$20.31 per acre respectively.

The results, as a whole, show in the most striking way the need of this soil for phosphoric acid in the growth of pea-vine hay.

#### EFFECT ON YIELD OF PEAS.

The pea yields point to the same conclusions as for hay, the most profitable results coming from two quantities of phosphoric acid on the plats in Field C and three quantities from the plats in Field A.

Taking the results as a whole for both hay and peas, the most profitable application of phosphoric acid is 300 and 450 pounds of 16 per cent acid phosphate when the nitrogen and potash applications are constant at 3 and 12 pounds per acre respectively. By increasing the application of acid phosphate from 75 to 300 pounds the profit per acre, for hay and peas above cost of fertilizer, was increased 3.6 times.

*Effect of Varying Quantities of Potash.*—This portion of the experiments was planned to show the effect upon the yield of hay of varying quantities of potash, the nitrogen and phosphoric acid remaining constant. On one plat one-half the normal quantity of potash was applied, or about 3.0 per cent in the actual fertilizer mixture used, while on two other plats two and three times the normal quantities were given, or 24 and 36 pounds per acre, the percentage of potash in the highest application being somewhat in excess of 10 per cent.

#### EFFECT ON YIELD OF HAY.

While there are some variations in the yield, the results show decreased rather than increased yields from applications of potash, and on none of the plats in either of the fields were the profits from the applications of potash in any quantity as great as from phosphoric acid alone.

On the whole, these tests show that potash used beyond 12 pounds per acre has decreased yields and profits.

#### EFFECT ON YIELD OF PEAS.

In the four years experiments on plats in Field C the increase in the yields of peas was very small and not sufficient to overcome the cost of fertilizer, which was used, in three out of four cases, at a loss. In one year's experiments on the plats in Field A the fertilizer application produced decided increase in pea yields, but the profits in only two cases were greater than from phosphoric acid alone and in only one from phosphoric acid and potash, and the increases in these cases were small.

Taking them altogether, the results show that increases in quantities of potash have not profitably added to the yields of peas.

*Effect of Varying Quantities of Fertilizer.*—These experiments show the effect of increasing and decreasing the normal (N P K equals 300 pounds of a fertilizer mixture containing 8 per cent phosphoric acid, 4 per cent of potash, and 1 per cent nitrogen) fertilizer application on the yields of hay and peas. The applications were at the rate of 150 pounds per acre,  $1\frac{1}{2}$  (N P K); 300 pounds per acre, N P K; 450 pounds per acre  $1\frac{1}{2}$  (N P K); 600 pounds per acre, 2 (N P K); and 900 pounds per acre, 3 (N P K).

#### EFFECT ON YIELD OF HAY.

The results show an increased yield of hay for the increased applications on the plats in Field A, the greatest average profit coming from the application of 600 pounds of fertilizer per acre; while on plats in Field C 300 pounds per acre gave the most profitable yields.

## EFFECT ON YIELD OF PEAS.

The most profitable yields were obtained on both fields from the plats receiving 600 pounds of the normal fertilizer application. Considering both hay and peas, the profit per acre was increased as the application was increased, the profit from the use of 900 pounds being 5.9 times greater than that from the use of 150 pounds per acre.

## PHOSPHORIC ACID.

The results from the different experimental fields of the Piedmont Section of North Carolina contained in this bulletin show conclusively that phosphoric acid is the chief requirement of all the soils tested, except those of the Iredell loam. With this exception, wherever it has been applied the yields on an average have been markedly increased. Chemical analyses show that the total supply in any of the types of soil examined in the Piedmont Section which are farmed extensively is below that commonly required for the production of maximum crops, except the Iredell loam, the Mecklenburg loam, the Congaree silt loam and the Congaree fine silt sandy loam soils. Twenty to twenty-five large corn crops would require as much of this constituent as is contained in the surface 6 $\frac{2}{3}$  inches per acre of most of the types occurring in the Piedmont Section of the State.

There are several sources from which phosphoric acid is commonly obtained as a fertilizer. These are acid phosphate, bone meal, basic slag, and ground phosphate rock or floats. Floats is the name given to ground phosphate rock; acid phosphate is the same material treated with an equal amount of sulphuric acid; basic slag is a by-product of the manufacture of steel from phosphatic iron ore, and bone meal is a by-product of slaughter houses.

Of these acid phosphate is the foremost extensively used in this State it being the more available carrier of phosphoric acid. It is readily available and consequently acts quickly. Bone meal either raw or steamed is suitable but is scarce and is a more expensive carrier of phosphoric acid than the others. Basic slag is a desirable form, if not too expensive, for sour soils, since it contains lime as well as phosphate and consequently assists in correcting any possible acidity. Phosphoric acid in this form, however, is not as available as that derived from acid phosphate. The ground rock or floats undoubtedly furnishes the cheapest source of phosphoric acid to be used in the permanent improvement of the soils of this section. Phosphoric acid can be secured in this material at about one-fourth of what it would cost in acid phosphate and one-third as much as in slag. It is not readily available, but when applied in combination with stable manure or turned under with a green crop, it usually has considerable effect the first year.

By the use of the rock in the proper way, not only are the yields generally increased rapidly, but the soil will be enriched in phosphoric acid about four times as fast. The practice of mixing rock phosphate with manure as it accumulates in the stable is certainly commendable. We advise the addition of 75 to 100 pounds to each ton of manure for the soils of this section. Another method of using the rock phosphate is to apply it to clover sod or a green catch crop. In this case we would rec-

commend an application of 800 to 1,000 pounds per acre every three or four years. It should be remembered, however, that as a general thing, for immediate returns, acid phosphate used in the proper way and in optimum quantity will usually be found to supply phosphoric acid in the form that will afford the largest profit per acre, although the phosphoric acid in the acid phosphate will cost two to three times as much per pound as that derived from finely ground phosphate rock.

#### NITROGEN.

Most of the cultivated soils of the Piedmont Region are very deficient in organic matter, and therefore lack nitrogen, as organic matter is the principal source of nitrogen in the soil. This source of supply is not sufficient as is shown by the plat results. Other than organic matter there are three sources from which to obtain nitrogen: commercial fertilizers, farm manure, and the free nitrogen of the air.

There are many nitrogenous materials used as fertilizer, but they are all expensive. Especially is this true for the Piedmont Region, since most of the general farm crops are heavy feeders on nitrogen. In the eastern part of the State where cotton is much more important commercial carriers of nitrogen can usually be used with profit. Where cotton is grown in the Piedmont Section, ordinarily here too the commercial forms of nitrogen may be used in fertilizing most soils and have them prove profitable. Where grains and grasses are grown chiefly, however, other sources will have to be depended upon largely. Stable manure furnishes one of the most desirable sources, as there are large amounts of organic matter in it as well as nitrogen, and at the same time considerable quantities of phosphoric acid and potash. Still, it is not a well-balanced fertilizer for these soils unless fortified with additional phosphoric acid. Valuable as it is, however, the supply of organic matter and nitrogen in the soils throughout this section cannot be built up through the use of manure alone, because in the production and handling of manure there is a great loss of the element nitrogen.

The only other available source is that contained in the air. Here we find the supply which must be largely depended upon in the permanent increase of the supply of this element in the soils of the Piedmont Section. Most crops, including the grain and grasses, are unable to draw upon the inexhaustible supply, but there is a large class known as legumes which have this power. The clovers, peas and beans, as is commonly known, are legumes. They furnish an economical means of maintaining and even upbuilding the supply of this most expensive element of plant food in soils. It has truthfully been said of them that "They not only feed themselves, but pay for the privilege," meaning that they not only secure nitrogen for their own growth but at the same time furnish a profitable crop.

#### POTASH.

Of all the types of soils of the Piedmont Plateau Region of the State thus far studied, the content of potash present in the surface soil is generally sufficient for growing maximum crops for a hundred years or more. It is generally more a problem of making this supply available

than of increasing it. Not only do the chemical analyses show that there is a fairly liberal supply of potash in these soils, but in no case do we find any marked increases in yield due to its use, and frequently the yield is actually reduced. Generally it certainly would give better immediate returns and would be far more beneficial to eliminate potash altogether for general farm crops, and put the money into an additional supply of phosphoric acid. Potash, however, can be applied with profit to tobacco and very probably to Irish potatoes on most of the Piedmont soils.

#### LIME.

The results on all the soils, with the exception of Field C at the Iredell farm where several crops of cowpeas had been previously plowed into the soil, do not indicate that the Piedmont soils in their present condition are particularly benefited by applications of lime, except for leguminous crops like crimson clover, vetch, and red clover, and for soils on which these have been plowed into them. Chemical examination does not show them to be strongly acid or generally lacking in lime. The soils thus far examined in the Piedmont Section show those of the Iredell, Mecklenburg and Congaree series in the order named to contain the highest percentage of lime.

#### CROP ROTATION NECESSARY FOR A PERMANENT SYSTEM OF AGRICULTURE.

It is the duty of every owner of agricultural land in this or any other section of the State to follow methods of crop rotation and fertilization which shall maintain the producing power of the fertile soils, and which shall build up that of the poorer ones. Our methods of farming should be such that the soils would become more productive year by year. The one great purpose in the present investigation of North Carolina soils as outlined in the beginning of this report, is to determine the most economical methods of fertilizing the various soil types, which, when applied in conjunction with proper crop rotation, will increase the producing power and thereby establish a better system of agriculture in the Piedmont Region of the State.

We have experimental work in progress in this section which has this end in view. All of the results thus far secured in the experiments on the outlying fields and a resumé of all the results from 1902 through 1909 with cotton, corn and cowpeas at the two experimental farms in the Piedmont Section are presented in Tables I-X of this Bulletin. From the information at hand we are able to recommend methods which if followed on the main soil types of the Piedmont Section of the State will come nearer maintaining their productivity than the methods more commonly now in practice.

Such a system of management must first of all include the application of phosphoric acid. In addition, it must include either the use of large quantities of farm manures or the turning under of leguminous crops. The organic matter in the case of the greater part of the cultivated soils of the Piedmont Section must be increased before maximum grain crops can be produced at a profit. With this purpose in view the following rotations are recommended:



*Three-year Rotation.*

First Year—Corn, with soja beans or cowpeas drilled in row at planting or before first cultivation. They may too be sown broadcast before last cultivation.

Second Year—Wheat, red clover.

Third Year—Red clover.

This is a short rotation admirably adapted to the grain farms of the section. The corn stover and wheat straw should be plowed under or fed to stock and the manure carefully saved and returned to the soil. The soja beans or cowpeas should be turned under and likewise the last crop of red clover.



Fig. XIII. Building up the productivity of the soil by sowing cowpeas broadcast in the corn at the last working.

In starting this rotation we would recommend an application of 200 to 400 pounds of acid phosphate under the corn and 75 to 100 pounds of nitrate of soda used as a top dressing. If available, farm manure may be used with the phosphate and the nitrate eliminated. This fertilization applies to the more extensively tilled types. The nitrogen application could well be reduced or left off entirely on new land or on the darker phases or types. Unless lime has been applied within the last two or three years, an application of 1,000 pounds of ground limestone per acre should be added to those soils on which legumes are to be grown and to those containing a considerable amount of organic matter. The lime should be applied broadcast and be thoroughly incorporated with the surface soil with a disk or spike-tooth harrow at the time of preparing the land for corn or wheat crop.

The first year wheat is grown it should receive similar treatment to

that recommended for corn. In addition to the acid phosphate it would be well to apply 200 to 400 pounds of rock phosphate per acre, as this fertilization is for both the wheat and clover crops.

An application of 600 to 800 pounds of rock phosphate per acre to the crop of clover before it is turned under in the fall should furnish sufficient phosphoric acid for the crops of the second period of this rotation. Within a comparatively short time enough nitrogen should be furnished by the soja beans, or cowpeas, the clover, and the roughage, or stable manure if crops are fed, that the nitrate could be entirely dispensed with. The application of rock phosphate and lime should be made every 4 or 5 years. Livestock farming in connection with this rotation would materially help in improving the productivity of these soils.

#### FOUR-YEAR ROTATIONS.

A good four-year rotation is the same as the above with oats and soja beans or cowpeas following corn the second year.

Other four-year rotations which could be adopted in this section are:

First Year—Corn.

Second Year—Crimson clover and cowpeas or soja beans.

Third Year—Wheat, red clover.

Fourth Year—Red clover.

Or for sections of the Piedmont Plateau in which cotton is grown use one similar to this:

First Year—Corn.

Second Year—Wheat, red clover.

Third Year—Red clover.

Fourth Year—Cotton, rye.

A similar method of fertilization should be adopted with these four-year rotations as is given for the three-year rotation.

#### FIVE- OR SIX-YEAR ROTATIONS.

Any of these rotations with two years of pasture added would make them even better adapted to livestock farming. Where it is desired to grow cotton, the following six year rotation should under an intelligent supplemental system of fertilization and proper cultivation, give good results:

First Year—Corn, with cowpeas in the row or sown broadcast just before the last cultivation.

Second Year—Cotton, with rye sown broadcast in the cotton after the first picking and covered with a harrow or light cultivator.

Third Year—Cowpeas, wheat.

Fourth Year—Wheat, red clover.

Fifth Year—Red clover.

The fertilizer here too would be similar to that indicated above for a three-year rotation.

## CRIMSON CLOVER IN CORN.

A good and practical method of soil improvement and the production, at the same time, of profitable corn crops, is to grow a crop of corn and crimson clover each year, using good fertilization on the corn crop at first. Crimson clover is sown in corn during the latter part of August or early in September. A crop of crimson clover is obtained in this way each year and very little difficulty is found in getting a stand of



Fig. XIV. Crimson clover sown in fall of 1906 after taking off crop of corn. Clover two feet high when photographed on May 13, 1907.

crimson clover in the corn. The productiveness of the land can be rapidly increased with this cropping provided sufficient amounts of phosphoric acid be applied.

## CHEMICAL COMPOSITION OF PIEDMONT SOILS.

Fourteen years ago the mapping of the soils of the State was started. The maps, which are being made of the various counties, show the location and extent of each type of soil. Thus far about 40 per cent of the total land area of the State has been worked from which a large number of soil samples have been collected and analyzed. These analyses are brought together on the following pages. They have been used in connection with this report and these and other analyses will be used in our further investigations of the soils and crops of the State. The analyses show all of the Piedmont soils to be fairly well provided with potash; poorly provided with phosphoric acid, with the exception of

those of the Iredell loam; and fairly well stored with lime. The Iredell, the Congaree and the Mecklenburg series of soils and the Durham sandy loam type in Cabarrus and Caswell counties generally have been found to contain high amounts of lime. Of all of these, the soils of the Iredell series are decidedly richer in this constituent than any other of the soils of the Piedmont Section examined. The amount of nitrogen present in these soils is usually quite small and variable, the quantity present being dependent upon the amount of organic matter contained in the soil. The field experiments which have been made on these soils and presented, in part, in this report, show that potash is not usually needed for the production of good crops, but that phosphoric acid and nitrogen are the most important constituents. The soil analyses and the experiments point the way to the proper use of fertilizers for the production of profitable crops in the Piedmont Section, as well as the kind of fertilization and rotations to be followed for the permanent improvement of the soils. Phosphates in some form must be used liberally, nitrogen must be supplied either in fertilizers or by growing soil-improving crops, while potash is not generally needed.

A study of these analyses will prove of interest and value to those who are farming in the Piedmont Section of the State. They are fundamentally important in connection with a more profitable and progressive agriculture for this portion of North Carolina.

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## COMPOSITION OF CECIL SANDY LOAM.

Depth in Inches to Which Sample Was Taken	Sample Number	Location	County	Percentage of Fine Earth > 2 mm	Percentage Composition of Fine Soil on Dry Basis					Pounds of Total Plant Food Constituents per Acre				
					Nitro- gen	Phos- phoric acid	Potash	Line, CaO.	Mag- nesia, MgO.	Nitro- gen	Phos- phoric acid	Potash	Line, CaO.	Mag- nesia, MgO.
Average of all the analyses of the type			{ Surface Subsoil	97.48	.0395	.028	2.31	.159	.28	770	546	45036	3100	5459
0-14	1125	3½ miles s. e. of Gastonia	Gaston	99.09	.025	.058	1.54	.174	.43	1982	4598	122079	13793	34087
14-36	1126			{	.036	.005	1.488	.12	---	702	97	29046	2342	---
36-54	1127			{	.021	.066	8.57	.02	---	1636	5143	66777	1558	---
54-86	1128			{	.044	.053	3.94	.10	---	854	1029	76514	1942	---
86-108	1129	1 mile n. of Harden	Gaston	97.1	.034	.118	2.37	.134	---	2720	9440	180600	10720	---
108-130	1130			{	.039	.038	4.522	.14	---	780	760	94400	2800	---
130-152	1131			{	.030	.090	1.799	.093	---	2400	7200	143920	7440	---
152-174	1132			{	.018	.032	3.73	.08	---	380	640	74600	1600	---
174-196	1133	2 miles w. of Gastonia	Gaston	100	.017	.0325	2.70	.04	---	1360	2600	216000	3200	---
196-218	1134			{	.048	.0485	2.118	.0815	---	931	941	41089	1562	---
218-240	1135			{	.023	.104	1.264	.062	---	1794	8112	98592	4836	---
240-262	1136			{	.037	.0353	3.159	.1041	---	727	693	62105	2046	---
Average of all analyses for Gaston County			{ Surface Subsoil	98.3	.025	.0521	1.798	.0698	---	1378	6496	142258	5523	---
0-8	1324	7 miles w. of Pineville	Mecklenburg	100	.022	.021	2.40	.08	.29	440	420	48000	1600	5800
8-16	1325			{	.019	.006	1.37	.091	.44	1520	480	109600	7280	35200
16-24	1326			{	.033	.016	.41	.082	.44	660	320	8200	1640	8800
24-32	1327			{	.027	.034	4.33	.150	.42	2160	2720	346400	12000	33600
32-40	1328	3 miles s. w. of Cornhus	Mecklenburg	100	.027	.018	1.91	.14	.11	596	357	37933	2780	2185
40-48	1329			{	.014	.040	1.65	.03	.43	1120	3200	132000	2400	34400
48-56	1330			{	.036	.011	2.508	.3911	---	647	198	45043	7024	---
56-64	1331			{	.027	.076	1.099	.99	---	2160	6080	87920	7920	---
64-72	1332	9 miles n. n. e. of Concord. Near Bogert's Chapel	Cabarrus	99.3	.047	.046	.005	.48	---	940	920	12100	9600	---
72-80	1333			{	.010	.015	1.60	.45	---	2000	7600	128000	36000	---
80-88	1334			{	.087	.033	1.841	.22	---	1704	646	38123	4309	---
88-96	1335			{	.022	.041	1.36	.15	---	1743	3248	107723	11881	---
Average of all analyses for Locust Hill			{ Surface Subsoil	97.95	.027	.041	1.36	.15	---	1743	3248	107723	11881	---
0-8	923	4-8 miles n. of Yanceyville	Caswell	100	.047	.046	.005	.48	---	940	920	12100	9600	---
8-16	924			{	.025	.035	1.60	.45	---	2000	7600	128000	36000	---
16-24	925			{	.087	.033	1.841	.22	---	1704	646	38123	4309	---
24-32	926			{	.022	.041	1.36	.15	---	1743	3248	107723	11881	---

## COMPOSITION OF CECIL SANDY LOAM—Continued.

Depth in Inches to Which Sample Was Taken	Sample Number	Location	County	Percentage of Fine Earth > 2 mm	Percentage Composition of Fine Soil on Dry Basis				Pounds of Total Plant Food Constituents per Acre					
					Nitro-gen	Phos-phoric acid	Potash	Lime, CaO.	Mag-nesia, MgO.	Nitro-gen	Phos-phoric acid	Potash	Lime, CaO.	Mag-nesia, MgO.
0-12	1360	} 7 miles s. of Oxford.....	Granville.....	{ 97.4	.042	.018	.922	.150	---	818	351	17960	2922	---
12-36	1361				.022	.039	1.50	.131	---	1760	3120	120000	10480	---
0-8	1427	} 5½ mi. n. w. of Rockingham.....	Richmond.....	{ 86.5	.045	.018	1.36	.12	---	778	311	23528	2076	---
10-36	1428				.037	.029	1.18	.104	---	2859	2241	91190	8037	---
0-8	1481	} 3½ miles n. e. of Clayton.....	Johnston.....	{ 98.7	.038	.028	2.87	.24	---	750	552	56653	4738	---
10-36	1482				.025	.0382	1.464	.12	---	2000	3056	117120	9600	---
0-7	1543	} 5 2-5 miles n. e. of Clayton.....	Johnston.....	{ 100	.054	.021	3.215	.020	---	1080	420	64300	400	---
9-30	1544				.032	.034	1.30	.150	---	2560	2720	104000	12000	---

## COMPOSITION OF CECIL CLAY.

Average of	all the analyses of the type....	{ Surface..... Subsoil.....	{	97.5	.073	.063	.41	.21	.31	1424	1229	7965	4111	6055
					.032	.095	.44	.14	.27					
0-3.5	1113	1½ miles n. e. of Belmont.....	Gaston.....	99.4	.072	.068	.365	.06	-----	2545	7553	35982	11133	21492
3.5-36	1114			98.8	.032	.101	.340	.071	-----	1423	1344	7212	1186	-----
0-6	1129	5 miles s. of Belmont.....	Gaston.....	100	.153	.12	.86	.266	-----	2560	8080	27900	5680	-----
0-36	1130			100	.045	.096	.616	.175	-----	3060	2400	17200	5320	-----
0-4	1131	4½ miles s. e. of New Hope Church.....	Gaston.....	89.9	.094	.078	.417	.254	-----	3600	7680	49280	14000	-----
4-36	1132			100	.0261	.107	.318	.061	-----	1600	1402	7498	4507	-----
0-4	1145	2½ miles e. of Stanley Creek.....	Gaston.....	100	.045	.074	.906	.133	-----	2088	8560	25440	4880	-----
4-20	1146			100	.032	.120	.819	.092	-----	900	1480	18120	2660	-----
0-6	1322	5½ miles w. of Pineville.....	Mecklenburg.....	100	.069	.028	.28	.18	.29	2560	9600	65520	7360	-----
8-36	1323			100	.033	.048	.181	.214	.12	1380	500	5600	3600	5800
0-7	1346	5 miles w. of Huntersville....	Mecklenburg.....	100	.087	.062	.353	.343	.44	2640	3840	14480	17120	9000
9-36	1347			100	.033	.011	.254	.090	-----	1740	1240	7060	6860	8800

0-8	1185	} Test field.....	Mecklenburg.....	97.7	.059	.069	.538	.183	.11	1153	1348	10513	3576	2149	
0-36	1186			98.4	.022	.0494	.616	.154	.13	1732	3889	48492	12123	10234	
Aver age of		all analyses from Gaston Co....		97.2	.0912	.085	.637	.178	-----	1777	1656	12408	3460	-----	
Aver age of		all analyses from Mecklen- burg County.....		100	.0337	.106	.519	.10	-----	6296	8480	41520	8900	-----	
0-8		} 3½ miles s. w. of Harrisburg.....		99.23	.071	.053	.39	.233	.28	1409	1052	7740	4624	5556	
0-36		} 3½ miles s. w. of Harrisburg.....		99.46	.029	.0361	.3503	.153	.125	2307	2872	27873	12174	10742	
0-7		} 3½ miles s. w. of Harrisburg.....		99.2	.081	.072	.147	.32	.47	1607	1428	2916	6348	9824	
0-36		} Cabarrus.....		100	.031	.245	.35	.17	.72	2480	19600	28000	13600	57600	
0-7		} 8 miles n. n. w. Rockingham.....		89.9	.014	.0120	.0293	.08	-----	252	216	527	1438	-----	
8-36		} Richmond.....		96.09	.051	.097	.379	.041	-----	3920	7457	29134	3152	-----	
0-6		} 3½ miles s. s. w. Yanceville.....		100	.054	.047	.218	.30	-----	1080	940	4360	6000	-----	
6-36		} Caswell.....		100	.010	.08	.540	.33	-----	800	6400	43200	26400	-----	

## COMPOSITION OF CECIL CLAY LOAM.

Average of	all the analyses of the type-----	{ Surface----- Subsoil-----	97.98	.066	.051	.46	.234	-----	1293	999	9014	4585	-----
0-5	} 1-3 miles n.e. of Boogerston.	{	89.6	.028	.092	.41	.223	1.41	2231	7330	32669	17769	28200
5-22			1162	.068	.033	.493	.11	1212	588	8785	1960	-----	
0-8			1193	.024	.075	.335	.081	1920	6000	26800	6480	-----	
0-36	} Iredell Test Farm, Field E, Plat 7-----	{	96.1	.0535	.048	.444	.06	1028	923	8534	1153	-----	
0-8			1194	.0222	.103	.324	.042	1740	8075	25402	3293	-----	
0-8	} Iredell Test Farm, Field A, Plat 4, Sec. 1-----	{	100	.050	.056	.307	.092	1.41	1000	1120	6140	1840	28200
1205			1206	.066	.065	.397	.355	1320	1300	7940	7100	-----	
0-8	} Iredell Test Farm, Field A, Plat 11, Sec. 1-----	{	100	.031	.088	.326	.49	2480	7040	26080	39200	-----	
0-36			1208	.05	.003	.356	.061	1000	60	7120	1220	-----	
0-8	} Iredell Test Farm, Field A, Plat 18, Sec. 1-----	{	100	.052	.052	.317	.061	1040	1040	6340	1220	-----	
1211			1212	.084	.106	.536	.516	1680	2120	10720	10320	-----	
0-8	} Iredell Test Farm, Field A, Plat 2, Sec. 2-----	{	100	.047	.102	.509	.40	3760	8160	40720	32000	-----	
0-30			1214	.049	.062	.417	.061	980	1240	8340	1220	-----	
0-8	} Iredell Test Farm, Field A, Plat 18, Sec. 2-----	{	100	.047	.025	.344	.152	940	500	6880	3040	-----	
1215			1216	.047	.025	.344	.152	940	500	6880	3040	-----	
0-8	} Iredell Test Farm, Field G, Plat 5-----	{	100	.047	.025	.344	.152	940	500	6880	3040	-----	
1217			1218	.047	.025	.344	.152	940	500	6880	3040	-----	

## COMPOSITION OF CECIL CLAY LOAM—Continued.

Depth in Inches to Which Sample Was Taken	Sample Number	Location	County	Percentage of Fine Earth 2 mm	Percentage Composition of Fine Soil on Dry Basis				Pounds of Total Plant Food Constituents per Acre					
					Surface				Subsoil					
					Nitro-gen	Phos-phoric acid	Potash	Lime, CaO.	Mag-nesia, MgO.	Nitro-gen	Phos-phoric acid	Potash	Lime, CaO.	Mag-nesia, MgO.
0-8	1219	Iredell Test Farm, Field D, Plat 4.	Iredell	100	.076	.013	.285	.163	---	1520	260	5700	3260	---
0-8	1221	Iredell Test Farm, Field D, Plat 6.	Iredell	100	.078	.018	.254	.090	---	1560	360	5080	400	---
10-36	1222	Iredell Test Farm, Field D, Plat 9.	Iredell	100	.031	.088	.227	.075	---	2480	7040	18160	6000	---
0-8	1223	Iredell Test Farm, Field D, Plat 9.	Iredell	100	.109	.005	.316	.173	---	2180	100	6320	3460	---
0-8	1225	Iredell Test Farm, Field D, Plat 11.	Iredell	100	.084	.093	.267	.113	---	1680	1860	5340	2260	---
0-8	1227	Iredell Test Farm, Field B, Plat 5, Sec. 2.	Iredell	100	.052	.031	.215	.092	---	1040	620	4300	1840	---
10-36	1228	Iredell Test Farm, Field B, Plat 5, Sec. 2.	Iredell	100	.026	.088	.193	.098	---	2080	7040	15440	7840	---
0-8	1229	Iredell Test Farm, Field B, Plat 4, Sec. 2.	Iredell	100	.057	.041	.234	.011	---	1140	820	4680	820	---
0-8	1231	Iredell Test Farm, Field B, Plat 5, Sec. 1.	Iredell	100	.067	.074	.328	.359	---	1340	1480	6560	7180	---
10-36	1232	Iredell Test Farm, Field B, Plat 5, Sec. 1.	Iredell	100	.034	.117	---	.148	---	2720	9360	---	11840	---
0-8	1233	Iredell Test Farm, Field B, Plat 4, Sec. 1.	Iredell	100	.073	.044	.224	.418	---	1460	880	4480	8360	---
0-8	1235	Iredell Test Farm, Field C, Plat 8, Sec. 1.	Iredell	100	.063	.012	.464	.47	---	1260	240	9280	9400	---
10-36	1236	Iredell Test Farm, Field C, Plat 8, Sec. 1.	Iredell	100	.028	.107	.36	.063	---	2240	8560	28800	5040	---
0-8	1237	Iredell Test Farm, Field C, Plat 8, Sec. 2.	Iredell	100	.049	.139	.265	.44	---	980	2780	5300	8800	---
10-36	1238	Iredell Test Farm, Field C, Plat 8, Sec. 2.	Iredell	100	.029	.213	.126	.38	---	2320	17040	10080	30400	---
0-6	1336	1½ miles s. w. of Mint Hill.	Mecklenburg	96.5	.056	.015	.132	.1332	---	1081	869	2548	2571	---
8-36	1337	1 mile w. of Paw Creek.	Mecklenburg	100	.021	.085	.228	.1610	---	1680	6800	18240	12880	---
0-7	1340	1 mile w. of Paw Creek.	Mecklenburg	96.3	.063	.077	.943	.244	---	1213	1483	18162	4699	---
9-36	1341	1 mile e. of Caldwell.	Mecklenburg	100	.025	.092	.530	.204	---	2000	7360	42400	16320	---
0-6	1350	1 mile e. of Caldwell.	Mecklenburg	100	.040	.031	.242	.441	---	800	620	4840	8820	---
8-36	1351	1 mile e. of Caldwell.	Mecklenburg	100	.018	.080	.270	.220	---	1440	6400	21600	17600	---



COMPOSITION OF CECIL COARSE SANDY LOAM.

Average of all the analyses from Iredell County-----		{ Surface----- Subsoil-----		99.12-----		.0643-----		.049-----		.3316-----		.20-----		1275-----		971-----		6574-----		3965-----	
Average of all the analyses from Mecklenburg Co. county-----		{ Surface----- Subsoil-----		99.77-----		.0316-----		.012-----		.283-----		.21-----		2522-----		958-----		22583-----		16761-----	
0-8 1255 }-----		{ Cabarrus-----		{ 89.5-----		{ .021-----		{ .0856-----		{ .342-----		{ .195-----		{ 1680-----		{ 6848-----		{ 27413-----		{ 1560-----	
10-36 1256 }-----		{ Cabarrus-----		{ 97.7-----		{ .020-----		{ .051-----		{ .900-----		{ .08-----		{ 1563-----		{ 3986-----		{ 70344-----		{ 6252-----	
0-7 1273 }-----		{ Cabarrus-----		{ 100-----		{ .101-----		{ .104-----		{ 1.91-----		{ .66-----		{ 2020-----		{ 2080-----		{ 38200-----		{ 13200-----	
9-30 1274 }-----		{ Cabarrus-----		{ 100-----		{ .027-----		{ .073-----		{ 1.048-----		{ .542-----		{ 2160-----		{ 5840-----		{ 83840-----		{ 43360-----	
0-6 1289 }-----		{ Granville-----		{ 100-----		{ .062-----		{ .057-----		{ .850-----		{ .131-----		{ 1240-----		{ 1140-----		{ 17000-----		{ 2020-----	
8-36 1290 }-----		{ Granville-----		{ 100-----		{ .025-----		{ .133-----		{ .938-----		{ .140-----		{ 2000-----		{ 10640-----		{ 75040-----		{ 11200-----	
0-8 1362 }-----		{ Granville-----		{ 97.1-----		{ .071-----		{ .064-----		{ .619-----		{ .284-----		{ 1379-----		{ 1243-----		{ 12021-----		{ 5515-----	
8-36 1363 }-----		{ Granville-----		{ 100-----		{ .029-----		{ .062-----		{ .863-----		{ .329-----		{ 2220-----		{ 4960-----		{ 69040-----		{ 26320-----	
0-7 1475 }-----		{ Johnston-----		{ 80.9-----		{ .119-----		{ .0181-----		{ .265-----		{ .502-----		{ 1925-----		{ 293-----		{ 4288-----		{ 8122-----	
9-36 1476 }-----		{ Johnston-----		{ 97.9-----		{ .046-----		{ .0052-----		{ .16-----		{ .34-----		{ 3603-----		{ 407-----		{ 12531-----		{ 26029-----	

COMPOSITION OF CECIL COARSE SANDY LOAM.

Average of all the analyses of the type-----		{ Surface----- Subsoil-----		85.7-----		.043-----		.034-----		2.032-----		.465-----		737-----		583-----		34828-----		7970-----	
0-10 1119 }-----		{ Gaston-----		{ 94.4-----		{ .02-----		{ .06-----		{ 1.71-----		{ .218-----		{ 1510-----		{ 4531-----		{ 130139-----		{ 16463-----	
10-36 1120 }-----		{ Gaston-----		{ 81.1-----		{ .063-----		{ .05-----		{ 3.00-----		{ .081-----		{ 1022-----		{ 811-----		{ 48660-----		{ 1314-----	
0-12 1157 }-----		{ Gaston-----		{ 90.8-----		{ .02-----		{ .064-----		{ 2.02-----		{ .071-----		{ 1453-----		{ 4649-----		{ 146733-----		{ 5157-----	
14-36 1158 }-----		{ Gaston-----		{ 94.8-----		{ .044-----		{ .007-----		{ .574-----		{ .06-----		{ 834-----		{ 133-----		{ 10883-----		{ 1138-----	
0-8 1352 }-----		{ Mecklenburg-----		{ 97.1-----		{ .02-----		{ .059-----		{ 1.00-----		{ .092-----		{ 1554-----		{ 4583-----		{ 77680-----		{ 7147-----	
10-36 1353 }-----		{ Mecklenburg-----		{ 84.3-----		{ .031-----		{ .033-----		{ .373-----		{ 1.45-----		{ 523-----		{ 556-----		{ 6289-----		{ 24447-----	
0-10 1287 }-----		{ Cabarrus-----		{ 96.2-----		{ .024-----		{ .065-----		{ .245-----		{ .23-----		{ 1847-----		{ 5002-----		{ 18856-----		{ 17700-----	
12-36 1288 }-----		{ Cabarrus-----		{ 82.5-----		{ .036-----		{ .046-----		{ 4.18-----		{ .27-----		{ 594-----		{ 759-----		{ 68970-----		{ 4455-----	
		{ Cabarrus-----		{ 93.4-----		{ .017-----		{ .051-----		{ 3.578-----		{ .48-----		{ 1270-----		{ 3811-----		{ 267348-----		{ 36866-----	

## COMPOSITION OF CECIL FINE SANDY LOAM.

Depth in Inches to Which Sample Was Taken	Sample Number	Location	County	Percentage of Fine Earth 2 mm	Percentage Composition of Fine Soil on Dry Basis					Pounds of Total Plant Food Constituents per Acre				
					Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.					
Average of		all the analyses of the type----	{ Surface----- Subsoil-----	94.9	.0384	.0375	1.17	.196	.44	729	712	22207	3720	8351
0-10	1127	} 2½ miles n. e. of Gastonia----	Gaston-----	98.6	.0193	.0693	1.09	.129	.41	1522	5466	84979	10176	32341
10-36	1128			84.9	.033	.023	1.058	.161	-----	560	391	17965	2734	-----
0-8	1147	} 1½ miles s. w. of Alexis-----	Gaston-----	95.3	.048	.068	1.382	.101	-----	1760	5440	110560	8080	-----
8-36	1148			100	.044	.007	.998	.07	-----	915	133	19022	1334	-----
0-7	1151	} ½ mile s. e. of Stanley-----	Gaston-----	92.1	.014	.048	.884	.041	-----	1120	3840	70720	3280	-----
9-30	1152			98.1	.019	.059	.816	.051	-----	810	424	11973	1105	-----
0-6	1141	} ½ mile n. of High Shoals----	Gaston-----	89.3	.043	.008	.898	.494	-----	768	143	16038	8823	-----
6-36	1142			91.4	.029	.069	.100	.081	-----	2120	5045	7312	5923	-----
0-6	1155	} 1½ miles n. w. of Lowell----	Gaston-----	98.4	.03	.03	.985	.141	-----	590	590	19384	2775	-----
8-30	1156			100	.016	.0571	2.31	.082	-----	1280	4868	184800	6560	-----
Average of		all analyses from Gaston County-----	{ Surface----- Subsoil-----	92.0	.035	.018	.918	.185	-----	644	331	10891	3404	-----
0-7	1269	} 1½ miles n. w. of Concord----	Cabarrus-----	97.9	.02	.06	1.098	.071	-----	1566	4699	85995	5561	-----
9-36	1270			99.2	.044	.171	4.833	.572	-----	873	3392	94919	11348	-----
0-12	1356	} 3¾ miles n. n. w. of Newells----	Mecklenburg----	100	.032	.018	1.37	.17	-----	1520	8960	218400	3200	-----
14-36	1357			100	.018	.041	1.136	.261	-----	628	354	26907	3339	-----
0-8	1332	} 2½ miles s. of Matthews-----	Mecklenburg----	97.8	.038	.016	.205	.14	-----	1440	3280	90880	20880	-----
10-36	1333			100	.015	.096	.222	.083	-----	743	313	4010	2738	-----
0-8	1301	} 3 miles s. w. of Oxford-----	Granville-----	100	.030	.018	.151	.060	.44	1200	7680	17760	6640	-----
12-36	1302			100	.027	.092	.214	.194	.41	2160	7360	17120	15520	32800
0-8	1485	} 4 miles e. of Clayton-----	Johnston-----	93.7	.042	.0611	.55	.09	-----	787	1145	10307	1686	-----
12-36	1486			96.2	.014	.051	1.152	.36	-----	1077	3925	88658	27706	-----

## COMPOSITION OF CECIL LOAM.

Aver age of	all the analyses of the type---	{ Surface----- Subsoil-----	90.12 100	.0475 .027	.0855 .0380	1.164 1.218	.251 .143	856 2160	1541 4640	20980 97440	4524 11440
0-6	1291	{ 1½ miles s. e. of Oak Hill----- Granville-----	87.04	.033	.132	1.629	.242	574	2298	28358	4213
8-28	1292		100	.019	.082	1.762	.071	1520	6560	140960	5680
0-6	1364	{ ----- Granville-----	93.2	.062	.039	.70	.26	1156	727	13048	4846
6-36	1365		100	.035	.035	.674	.216	2800	2800	53920	17280
Aver age	a analyses for Granville County--	{ Surface----- Subsoil-----	90.12 100	.0475 .027	.0855 .0380	1.164 1.218	.251 .143	856 2160	1541 4640	20980 97440	4524 11440

## COMPOSITION OF CECIL STONY LOAM.

0-7	1137	{ 2¼ miles s. e. of Phillipsburg----- Gaston-----	81.6	.063	.04	1.505	.121	1028	653	24562	1975
7-36	1138		100	.02	.076	1.626	.254	1000	6080	130080	20320

## COMPOSITION OF CECIL STONY SANDY LOAM.

0-7	1473	{ 1 mile n. e. of Clayton----- Johnston-----	91.8	.043	.0382	1.053	.12	789	518	19333	2203
10-30	1474		100	.0108	.0258	1.688	.18	864	2064	135040	14400

## COMPOSITION OF CECIL GRAVELLY LOAM.

0-7	1429	{ 6¼ miles n. w. of Rockingham----- Richmond-----	67.8	.026	.001	1.932	.05	353	13	26198	678
8-30	1430		81.7	.028	.14	1.446	.082	1830	9150	94511	5360

## COMPOSITION OF DURHAM SANDY LOAM.

Depth in Inches to Which Sample Was Taken	Sample Number	Location	County	Percentage of Fine Earth 2 mm	Percentage Composition of Fine Soil on Dry Basis					Pounds of Total Plant Food Constituents per Acre				
					Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.	Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.
Average of all the analyses of the type----			{ Surface----- Subsoil-----	94.3	.023	.016	.336	.790	-----	434	302	6337	14899	-----
0-10 1299	1300	} 2 miles s. w. of Oxford-----	Granville-----	97.02	.018	.019	.469	.3785	-----	1397	1475	36202	29378	-----
12-36	1301			98.2	.022	.001	.16	.21	-----	432	20	1964	4124	-----
0-10 1334	1335	} 2 miles s. e. of Matthews-----	Mecklenburg-----	100	.019	.031	.242	.40	-----	1520	2480	19360	32000	-----
12-30	1336			95.9	.018	.003	.160	.190	-----	345	58	3069	3644	-----
0-10 1354	1355	} 2 1/4 miles e. of Huntersville-----	Mecklenburg-----	94.2	.022	.016	.261	.141	-----	1658	1206	19669	10626	-----
12-30	1356			95.9	.033	.025	.160	.61	-----	633	480	3069	11700	-----
14-26	1357	} 6 2-5 miles n. e. of Clayton-----	Johnston-----	100	.024	.021	.242	.75	-----	1920	1680	19360	60000	-----
0-7 1545	1546			95.9	.026	.013	.15	.22	-----	499	219	2877	4219	-----
9-36 1277	1278	} 2 miles n. of Mt. Pleasant-----	Cabarrus-----	95.1	.020	.011	.33	.16	-----	1522	837	25106	12173	-----
12-36	1279			96.8	.036	.01	1.23	1.61	-----	697	194	23813	31170	-----
0-10 926	927	} 3 miles s. w. of Ridgville-----	Caswell-----	96.2	.012	.008	1.375	.22	-----	924	616	105820	16931	-----
10-36	928			83.09	.05	.043	.22	1.90	-----	831	715	3656	31574	-----
				96.66	.014	.028	.365	.60	-----	1083	2165	28225	46397	-----

## COMPOSITION OF DURHAM FINE SANDY LOAM.

0-9 1303	1304	} 1 mile n. of Stevens-----	Granville-----	93.7	.046	.070	.251	.100	-----	862	1312	4704	1874	-----
12-36	1305			93.2	.023	.031	.517	.071	-----	1715	2311	38548	5294	-----

## COMPOSITION OF DURHAM LOAM.

Average of	all the analyses of the type....	Surface..... { Subsoil.....	94.9	.049	.015	.325	.295	930	285	6169	5599	-----
0-12 1295	{ 2 miles s. e. of Virgilina.....	{	98.5	.022	.036	.523	.36	1734	2837	41212	28368	-----
14-36 1296	{	Granville.....	92.4	.050	.003	.44	.05	924	55	8131	924	-----
0-8 1318	{ 1 mile s. of Gela.....	{	97	.022	.036	.78	.08	1707	2794	60328	6208	-----
10-30 1319	{	Granville.....	97.4	.048	.028	.21	.54	935	545	4091	10519	-----
			100	.022	.037	.267	.65	1760	2960	21360	52000	-----

## COMPOSITION OF DURHAM COARSE SANDY LOAM.

Average of	all the analyses of the type....	Surface..... { Subsoil.....	89.9	.034	.044	1.602	.353	.09	611	791	28804	6347	1618
0-10 1115	{ 3½ miles s. e. of Cherryville	{	93.1	.02	.031	1.257	.2868	.36	1490	2309	93621	21360	20813
10-32 1116	{	Gaston.....	81.7	.048	.005	.302	.050	-----	784	82	4935	817	-----
0-12 1153	{ ¾ mile n.w. Mountain Island	{	91.4	.038	.008	.480	.051	-----	2779	585	35098	3729	-----
14-36 1154	{	Gaston.....	84.8	.029	.038	.64	.170	-----	492	644	10854	2883	-----
0-8 1479	{ 4 4-5 miles n. e. Clayton	{	88.1	.016	.030	.60	.151	-----	1128	2114	42288	10642	-----
10-30 1480	{	Johnston.....	83.8	.024	.023	4.10	.46	-----	402	385	68716	7710	-----
0-7 1547	{ 7 miles n. e. of Clayton	{	94.5	.018	.0451	2.923	.225	-----	1361	3410	220979	17010	-----
9-36 1548	{	Johnston.....	95.8	.057	.059	.591	.15	-----	1092	1130	11324	2874	-----
0-10 1316	{ 1 mile s. of Oxford	{	95.1	.024	.05	.30	.55	-----	1655	3310	36327	17336	-----
14-36 1317	{	Granville.....	91.01	.012	.023	.41	.184	-----	456	951	5706	10461	-----
0-9 1271	{ 1½ miles of Concord	{	95.1	.026	.091	3.68	.75	.09	874	1675	29851	13397	-----
10-26 1272	{	Cabarrus.....	95.2	.014	.04	2.67	.89	.36	495	1731	69984	14265	1712
									1066	3043	203347	76255	27418

## COMPOSITION OF IREDELL FINE SANDY LOAM.

Average of	all the analyses of the type....	Surface..... { Subsoil.....	90.1	.0495	.048	.22	2.30	.39	892	865	3964	41446	7028
0-7 1121	{ ½ mile s.e. of New Hope Ch.	{	98.	.036	.0598	.20	2.33	2.34	2522	4688	15680	182672	183456
7-25 1122	{	Gaston.....	74.4	.067	.015	.121	.5	-----	997	223	1800	7440	-----
0-9 1135	{ ½ mile n. of Mt. Holly	{	100	.051	.053	.053	1.903	-----	4080	4240	4240	152240	-----
9-25 1136	{	Gaston.....	83.3	.065	.063	.194	4.82	-----	1083	1050	3232	80301	-----
			97.6	.045	.125	.115	3.33	-----	3317	9760	8979	260006	-----

COMPOSITION OF IREDELL FINE SANDY LOAM—*Continued*.

Depth in Inches to Which Sample Was Taken	Sample Number	Location	County	Percentage of Fine Earth 2 mm	Percentage Composition of Fine Soil on Dry Basis					Pounds of Total Plant Food Constituents per Acre				
					Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.	Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.
0-6	1143	{ 2½ miles n.e. of Stanley Creek	Gaston	{ 92.1	.052	.049	.214	4.56	-----	958	903	3942	83995	-----
6-18	1144				.059	.119	.1486	2.75	-----	4357	8787	10973	203060	-----
0-8	1344	{ 4 miles n. n. w. Paw Creek	Mecklenburg	{ 94.5	.047	.046	.200	3.5	-----	888	869	3780	66150	-----
10-24	1345				.029	.030	.237	4.66	3.98	2320	2400	18960	372800	-----
0-10	1358	{ 2¼ miles w. n. w. of Newells	Mecklenburg	{ 94.2	.036	.035	.340	.340	.39	678	659	6406	6406	7348
12-28	1359				.025	.037	.227	.724	.7	2000	2960	18160	57920	5600
0-10	314	{ 1½ mile n. of Belltown	Granville	{ 97.7	.047	.025	.27	1.86	-----	918	489	5276	36344	-----
14-36	315				.026	.034	.452	1.37	-----	2030	2655	35242	106970	-----
0-8	1259	{ 9½ miles n. n.e. of Concord	Cabarrus	{ 94.4	.0325	.102	.212	.53	-----	614	1926	4003	10006	-----
10-30	1260				.0340	.021	.177	1.56	-----	2685	1658	13976	123178	-----
Average of	all the analyses for Gaston Co.	{ Surface	.061	.042	.176	3.29	-----	1016	700	2932	51791	-----		
		{ Subsoil	.0516	.099	.1055	2.661	-----	3988	7651	8153	205642	-----		
COMPOSITION OF IREDELL STONY LOAM.														
0-8	1297	{ 1½ miles s. of Virgilia	Granville	{ 32.6	.093	.086	.223	5.625	.83	606	561	1454	36675	5412
10-24	1298				.035	.067	.335	3.890	1.07	1840	3522	17608	204458	56239
COMPOSITION OF IREDELL SANDY LOAM.														
Average of	all the analyses of the type	{ Surface	.037	.015	.12	1.45	-----	704	285	2283	27588	-----		
		{ Subsoil	.0225	.039	.099	1.61	-----	1800	3120	7920	128800	-----		
0-8	917	{ ¾ mile s. of Topnot	Caswell	{ 91.6	.030	.013	.120	.90	-----	550	238	2198	16488	-----
8-36	918				.018	.065	.104	.74	-----	144	5200	8320	59200	-----

0-7	932	} 1¼ miles s. of Fitch.....	Caswell.....	{ 98.66 100	.044	.017	.120	2.01	868	335	2368	39661
7-30	933				.027	.013	.094	2.49	2160	1040	7520	199200
Average of		all the analyses for Caswell Co.		{ Surface..... Subsoil.....	.037 .0225	.015 .039	.12 .099	1.45 1.61	704 1800	28 3120	2788 7920	2788 128800

## COMPOSITION OF IREDELL LOAM.

Average of																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								</
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## COMPOSITION OF GRANVILLE COARSE SANDY LOAM.

Sample Number	Location	County	Percentage of Fine Earth $\frac{1}{32}$ mm	Percentage Composition of Fine Soil on Dry Basis					Pounds of Total Plant Food Constituents per Acre				
				Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.	Surface	Subsoil	Potash	Lime, CaO.	Mag- nesia, MgO.
Average of all the analyses of the type-----				.021	.035	1.12	.15	.36	383	638	20404	2733	6558
0-10 {	all the analyses of the type-----	{ Surface----- Subsoil-----	91.09	.021	.029	1.725	.111	.92	1597	2207	131252	8446	686314
12-36 {			1307 {	95.11	.018	.033	1.11	.12	.36	331	607	20402	2206
0-9 {	1 mile n. of Creedmoor-----	Granville-----	91.9	.025	.035	2.60	.062	.92	1978	2769	205712	4905	72790
9-16 {			1308 {	98.9	.024	.066	2.16	.21	-----	467	1284	42034	4087
0-8 {	1/2 mile w. Mt. Energy-----	Granville-----	97.3	.01	.045	2.33	.19	-----	776	3493	180804	14749	-----
12-36 {			1309 {	97.03	.021	.0065	.09	.12	-----	353	109	1513	2017
0-8 {	1 mile n. of W. Mangum-----	Richmond-----	84.06	.029	.007	.244	.081	-----	2074	501	17451	5793	-----
12-36 {			1457 {	89.4									

## COMPOSITION OF GRANVILLE FINE SANDY LOAM.

0-7 {	1449 {	2 mi. w. of N. Covington P.O.	Richmond-----	97.6	.045	.072	.503	.12	-----	878	1405	9819	2146	-----
9-36 {	1450 {			100	.032	.088	1.76	.146	-----	2560	7040	140800	11680	-----

## COMPOSITION OF MECKLENBURG LOAM.

Average of all the analyses of the type-----					.053	.106	.717	2.771	1.97	1034	2067	13952	54035	39400
0-7 {	1263 {	all the analyses of the type-----	{ Surface----- Subsoil-----	97.5	.035	.133	.367	3.42	-----	2800	10640	29360	273600	-----
9-25 {	1264 {			98.3	.076	.110	1.19	3.583	-----	1494	2163	23395	70442	-----
0-7 {	1326 {	1/2 mile n. w. of Harrisburg--	Cabarrus-----	100	.0345	.21	.60	5.26	-----	2760	16800	48000	420800	-----
9-24 {	1327 {			96.8	.031	.102	.244	1.96	1.97	600	1975	4724	37946	39400
		5 miles w. n. w. of Pineville---	Mecklenburg-----	100	.036	.056	.135	1.59	-----	2880	4480	10800	127200	-----



## COMPOSITION OF MECKLENBURG CLAY LOAM.

Average of	all the analyses of the type-----	{ Surface----- Subsoil-----	.066 .050	.144 .166	.511 .3913	1.046 3.075	.73 1.72	1307 4000	2851 13280	10118 31304	20711 246000	14454 137600
0-7 8-24 1321	} 2½ miles s. w. of Shopton----	{ Meeklenburg-----	.076 .067	.031 .110	.356 .356	.447 2.027	----- -----	1520 5360	620 8800	7120 28480	8940 210160	----- -----
0-6 1330	} 8 miles s. e. of Charlotte-----	{ Meeklenburg-----	.069	.219	.962	.192	.72	1380	4380	19240	3840	14400
8-24 1331	} 8 miles s. e. of Charlotte-----	{ Meeklenburg-----	.049	.079	.591	2.27	-----	3020	6320	47280	181600	-----
0-6 1267	} 3½ miles s. of Harrisburg-----	{ Cabarrus-----	.053 .033	.184 .310	.215 .227	2.50 4.33	.74 1.72	1029 2640	3573 24800	4175 18160	48550 346400	14371 137600
8-30 1268	} 3½ miles s. of Harrisburg-----	{ Cabarrus-----	.033	.310	.227	4.33	1.72	2640	24800	18160	346400	137600

## COMPOSITION OF CONGAREE FINE SANDY LOAM.

0-10	1342	} 4 miles w. n. w. of Paw Creek.	Meeklenburg----	{ 100	.049	.151	2.04	.92	-----	980	3020	40800	18400	-----
12-36	1443													
1443														

## COMPOSITION OF CONGAREE FINE SAND.

0-7	1403	} 5 3/4 miles s. w. of Rockingham	Richmond	-----	{	100	.034	.005	1.742	1.432	-----	680	100	34840	-----	28640	-----
8-30	1404						100	.012	.003	1.88	.28	-----	960	240	150400	-----	22400

## COMPOSITION OF CONGAREE SILT LOAM.

Average of	all the analyses of the type.	{ Surface. Subsoil.	.134 .063	.1122 .032	1.28 1.071	1.125 2.090	2680 5040	2244 7456	25600 85680	22500 187200
0-7 1569	{ Guns' Ferry, Cape Fear River	{ Pender.	.176	.1025	1.45	1.18	3520	2050	29000	23600
8-20 1570			.051	.0754	1.189	1.97	4080	6032	95120	157600
0-18 1281	{ ¼ mi. n. of Georgeville on	{ Cabarrus.	.093	.122	1.12	1.07	1860	2440	22400	21400
20-36 1282			{ Buffalo Creek.	.075	.111	.953	2.21	6000	8880	76240

## COMPOSITION OF CONGAREE LOAM.

Sample Number	Location	County	Percentage of Fine Earth & mm	Percentage Composition of Fine Soil on Dry Basis					Pounds of Total Plant Food Constituents per Acre				
				Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.	Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.
Average of	all the analyses of the type-----	{ Surface----- Subsoil-----	96.97	.077	.036	1.728	.935	-----	1493	698	33513	18133	-----
0-10 944	1 1-3 miles w. of Milton-----	Caswell-----	98.87	.173	.071	1.700	.879	-----	13683	5616	134463	69525	-----
10-36 945			100	.100	.063	1.49	1.07	-----	2000	1260	29800	21400	-----
0-10 1491	2 4-5 miles n. w. of Clayton--	Johnston-----	100	.6	.147	2.00	1.15	-----	48900	11760	160000	92000	-----
12-36 1492			100	.084	.0087	1.653	1.30	-----	1680	174	33060	26000	-----
0-7 1505	6 miles s.w. of Rockingham--	Richmond-----	100	.027	.0087	1.54	1.03	-----	2160	696	123290	82100	-----
8-36 1506			100	.081	.061	1.72	1.123	-----	1620	1220	34400	22100	-----
0-7 1425	5 4-5 mi. n. w. of Rockingham.	Richmond-----	100	.033	.057	1.80	1.11	-----	2640	4560	141000	88800	-----
8-36 1426			87.9	.045	.011	2.05	.25	-----	791	193	36039	4305	-----
			95.5	.033	.074	1.463	.227	-----	2521	5654	111773	17343	-----

## COMPOSITION OF ALAMANCE SILT LOAM.

Average of	all the analyses of the type.....	{ Surface..... Subsoil.....	90.3	.039	.051	.602	.311	.27	704	921	10872	5616	4876
0-7	1338	{ 2½ miles e. of Mint Hill..... Mecklenburg.....	95.3	.030	.076	1.007	.179	.40	2897	5794	76293	13647	30496
9-24	1339		91.9	.039	.064	.20	.771	-----	717	1176	3676	14171	-----
0-6	1279	{ 3 mi. s. of Mt. Pleasant..... Cabarrus.....	95.8	.022	.039	.32	.151	-----	1686	2989	24525	11573	-----
8-24	1280		94.8	.072	.076	1.394	.23	.27	1365	1441	20430	4361	5119
0-7	1285	{ 1 mile s. e. of Georgeville .... Cabarrus.....	97.7	.048	.072	1.85	-----	.40	3752	5628	144596	-----	31264
9-30	1286		93.8	.030	.050	.383	.183	-----	563	938	7185	3433	-----
0-7	1431	{ 6½ miles n.w. of Rockingham Richmond.....	93.4	.039	.182	.831	.335	-----	2914	13599	62092	25031	-----
8-24	1432		80.9	.016	.016	.432	.061	-----	259	* 259	6990	987	-----
			94.4	* .044	.013	1.03	.051	-----	3323	982	77786	3852	-----

## COMPOSITION OF CABARRUS SLATE LOAM.

0-8 ----- 1284	1233 } ½ mile s. e. of Georgeville --- 1284	Cabarrus-----{	45.3 100	.101 .042	.096 .131	1.83 3.14	.30 .101	.94 .89	915 3360	870 10480	16580 251200	2718 8080	8516 71200
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## COMPOSITION OF GEORGEVILLE SILT LOAM.

Average of 0-7 8-36 0-7 8-36	all the analyses of the type----- } 7 miles n. w. of Rockingham } 2 miles e. of Covington-----	{ Surface----- Subsoil----- Richmond----- Richmond-----	60.36 92.0 70.02 89.9 50.7 95.5	.037 .026 .017 .014 .057 .039	.073 .090 .051 .120 .096 .06	1.62 2.031 1.58 1.952 1.66 2.11	.165 .100 .171 .080 .16 .121	447 1928 238 1007 578 2980	881 6674 714 8630 973 4584	19557 150619 22183 140388 16832 161204	1992 7416 2400 5754 1622 9244	----- ----- ----- ----- ----- -----
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## COMPOSITION OF ALTAVISTA SILT LOAM.

Average of 0-7 9-36 0-8 10-36	all the analyses of the type----- } 2½ miles n. w. of Covington-- } 12 miles s. of Oxford-----	{ Surface----- Subsoil----- Richmond----- Granville-----	100 100 100 100 100	.024 .017 .028 .015 .02 .019	.018 .0161 .006 .0052 .031 .027	.28 .442 .07 .236 .49 .649	.16 .337 .07 .339 .25 .335	480 1360 560 1200 400 1520	360 1288 129 416 620 2160	5600 35360 1400 18880 9800 51920	3200 26960 1400 27120 5000 20800	----- ----- ----- ----- ----- -----
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## COMPOSITION OF PEE DEE SILT LOAM.

Average of 0-8 12-36 0-7 8-18	all the analyses of the type----- } 3½ miles n. e. Covington----- } 1¾ miles n. e. of Magnum-----	{ Surface----- Subsoil----- Richmond----- Richmond-----	97.9 97.7 100 95.4 95.9 100	.043 .02 .066 .017 .02 .023	.016 .008 .016 .010 .016 .007	.162 .354 .213 .263 .111 .445	.125 .155 .14 .12 .11 .191	842 1563 1320 1297 384 1840	313 625 320 703 307 560	3172 27069 4360 20072 2129 3560	2448 12115 2800 9158 2094 15280	----- ----- ----- ----- ----- -----
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## COMPOSITION OF PENN SILT LOAM.

Depth in Inches to Which Sample Was Taken	Sample Number	Location	County	Percentage of Fine Earth & mm					Percentage Composition of Fine Soil on Dry Basis					Pounds of Total Plant Food Constituents per Acre				
				Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.	Nitro- gen	Phos- phoric acid	Potash	Lime, CaO.	Mag- nesia, MgO.	Surface	Subsoil	2,000,000 lbs.	8,000,000 lbs.	
Average of		all the analyses of the type	{ Surface	95.4	.0295	.661	.101	---	---	---	563	477	12612	1927	---	---		
0-7	1437	} 4½ mi. n.w. of Rockingham	{ Subsoil	99.2	.0325	1.57	.142	---	---	---	2579	1270	124595	11269	---	---		
10-36	1438		Richmond	94.6	.0120	.652	.101	---	---	---	227	719	12336	1911	---	---		
0-7	1451	} 3 miles n. of Covington	Richmond	98.4	.03	1.47	.180	---	---	---	2362	2047	115718	14170	---	---		
9-28	1452			96.2	.047	.013	.67	.102	---	---	---	904	250	12891	1962	---	---	
				100	.035	.008	.167	.104	---	---	2800	640	133600	8320	---	---		

## COMPOSITION OF JOHNSTON SILT LOAM.

0-7	1507	} 6 1-5 miles s. w. of Princeton	Johnston	100	.041	.05	1.420	.50	---	---	---	820	1000	28400	10000	---	---	---	---	---
8-36	1508			100	.0295	.042	1.359	.56	---	---	---	2360	3360	108720	44800	---	---	---	---	---

## COMPOSITION OF CONAWINGO CLAY.

Average of		all the analyses of the type	{ Surface	48.81	.084	.083	1.56	.622	---	---	---	820	810	15229	6072	---	---	---	---	---
0-6	331	} 1 mile n. e. of Hudson	{ Subsoil	52.53	.054	.103	1.839	.539	---	---	---	2269	4328	77282	22651	---	---	---	---	---
6-24	332			52.04	.103	.058	.924	.606	---	---	---	1072	604	9617	6307	---	---	---	---	---
0-8	333	} 1½ miles s. of Cedar Valley	Caldwell	51.31	.081	.109	1.227	.598	---	---	---	3325	4474	50366	24547	---	---	---	---	---
8-24	334			51.87	.058	.065	1.007	.654	---	---	---	602	674	10447	6785	---	---	---	---	---
0-8	329	} Taylorsville	Caldwell	43.95	.040	.069	1.189	.564	---	---	---	1406	2426	41805	19830	---	---	---	---	---
8-36	330			42.52	.093	.128	2.75	.607	---	---	---	791	1089	23586	5162	---	---	---	---	---
			Alexander	62.34	.042	.131	3.103	.557	---	---	---	2095	6533	154753	27779	---	---	---	---	---

## COMPOSITION OF CLAY.

1216	Granville.....	100	.032	1.493	.41	640	29850	8500	-----
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## COMPOSITION OF BRADLEY GRAVELLY LOAM.

0-7	1537	} 1½ miles s. w. of Clayton....	Johnston.....	{	54.0	.105	.0683	.171	.25	-----	1134	738	1847	2700	-----
9-36	1538		Johnston.....	{	97.7	.027	.073	.184	.16	-----	2110	5706	14381	12506	-----

## COMPOSITION OF RICHMOND SANDY LOAM.

0-8	1441	} 8½ m. w. of n. of Rockghm. Richmond.....	{	89.2	.054	.025	.145	.12	-----	963	446	2052	2141	-----
10-36	1442		{	89.3	.027	.062	1.75	.091	-----	1929	4429	125020	6501	-----

## COMPOSITION OF JOHNSTON LOAM.

0-7	1527	} 1 3-5 miles e. s. e. of Benson. Johnston.....	{	100	.150	.037	.408	.38	-----	3000	740	8169	7600	-----
10-36	1528		{	97.4	.098	.001	.572	.35	-----	7636	78	44570	27272	-----

**LEAF TOBACCO SALES FOR DECEMBER, 1914.**

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Pounds sold for producers.....	43,508,199
Pounds sold for dealers.....	2,943,804
Pounds sold for warehouses.....	2,651,292
	<hr/>
Total.....	49,103,295

**THE BULLETIN**  
OF THE  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE**  
**RALEIGH**

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Vol. 36, No. 4. - 611

APRIL, 1915.

Whole No. 208.

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I. ANALYSES OF FERTILIZERS—FALL SEASON, 1914.

II. REGISTRATION OF FERTILIZERS.

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of March 6, 1900.

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EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS

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## LETTER OF TRANSMITTAL

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RALEIGH, N. C., April 1, 1915.

HON. W. A. GRAHAM,  
*Commissioner of Agriculture.*

SIR:—I submit herewith analyses of fertilizers made in the laboratory of samples collected during the past fall. These analyses show fertilizers to be about as heretofore, and to be, generally, what was claimed for them. I recommend that it be issued as the April BULLETIN.

Very respectfully,

B. W. KILGORE,  
*State Chemist.*

Approved for printing:

W. A. GRAHAM,  
*Commissioner.*



## I. ANALYSES OF FERTILIZERS—FALL SEASON, 1914.

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By B. W. KILGORE, W. G. HAYWOOD,  
J. Q. JACKSON, E. S. DEWAR, E. B. HART, AND J. R. MULLEN.

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The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during the fall months of 1914. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

### TERMS USED IN ANALYSES.

*Water-soluble Phosphoric Acid.*—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural state, the phosphate has three parts of lime united to the phosphoric acid (called by chemists tri-calcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

*Reverted Phosphoric Acid.*—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

*Available Phosphoric Acid* is made up of the water-soluble and reverted; it is the sum of these two.

*Water-soluble Ammonia.*—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of

soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

*Organic Ammonia.*—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

*Total Ammonia* is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

#### VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate (as the costs of fertilizing materials are liable to change, as other commercial products are), but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacturers.

*Relative value per ton.* or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used were:

#### VALUATIONS FOR 1914.

##### *In Unmixed or Raw Materials.*

For phosphoric acid in acid phosphate.....	4	cents per pound.
For phosphoric acid in bone meal and Peruvian Guano..	3½	cents per pound.
For phosphoric acid in basic slag .....	4	cents per pound.
For nitrogen .....	19½	cents per pound.
For potash .....	4	cents per pound.

##### *In Mixed Fertilizers.*

For phosphoric acid .....	4½	cents per pound.
For nitrogen .....	21	cents per pound.
For potash .....	5	cents per pound.

#### HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percentage or Lbs. in 100 Lbs.</i>	<i>Value Per 100 Lbs.</i>	<i>Value Per Ton, 2,000 Lbs.</i>
8 pounds available phosphoric acid at 4½ cents...	0.36 × 20 =	\$ 7.20
2 pounds potash at 5 cents.....	0.10 × 20 =	2.00
1.65 pounds nitrogen at 21 cents.....	0.347 × 20 =	6.95
Total value .....	0.817 × 20 =	\$16.14

Freight and merchant's commission must be added to these prices.

# ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1914.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash	
<b>Brands claiming</b>										
5105	Atlantic Chemical Co., Norfolk, Va.	Atlantic Special Guano.	Clyde	8.00			.82	1.00	2.00	12.64
4933	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Standard	Siler City	9.69	.50	.38	.88	1.07	1.98	14.40
5033	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Little Giant Wheat and Grass Grower.	Burlington	8.26	1.30	.38	1.68	2.04	2.06	16.55
				8.98	.96	.52	1.48	1.80	3.18	17.48
<b>Brands claiming</b>										
5061	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Guano 8-1-3	Gilkey	8.00			.82	1.00	3.00	13.64
4900	General Mfg. Co., Norfolk, Va.	9-1-3 Guano.	Salisbury	8.79	.50	.40	.90	1.09	3.00	14.69
4902	Va.-Car. Chemical Co., Richmond, Va.	V. C. C. Co's Pinnacle Grain Grower	Troy	9.99	1.16	.38	1.54	1.87	2.28	17.74
				7.84	.72	.36	1.08	1.31	2.48	14.07
				8.00			1.00	1.22	3.00	14.40
5116	Baugh & Sons Co., Norfolk, Va.	Baugh's Southern States Excelsior Guano	Guilford College	8.06	.46	.48	.94	1.14	2.98	14.18
5119	Pocahontas Guano Co., Lynchburg, Va.	A. A. Complete Champion Brand	Colfax	9.54	.74	.20	.94	1.14	2.94	15.47
				8.00			1.65	2.00	2.00	16.13
<b>Brands claiming</b>										
5020	American Agricultural Chemical Co., New York, N. Y.	Canton Chemical Co's Game Guano	Cid	8.48	1.72	.44	2.16	2.63	2.06	18.76
5016	do	Detrick's Fish Mixture.	Conover	8.20	1.26	.30	1.56	1.89	2.02	15.95
5054	do	Lazaretto Crop Grower	Shelby	8.57	.62	.24	.86	1.05	2.82	14.14
4932	do	Standard Bradley's Guano	Siler City	9.60	1.48	.48	1.96	2.38	1.56	18.43
	do	Zell's Fish Guano.	Statesville	8.30	1.50	.30	1.80	2.19	2.06	17.09
5009	do	Bone and Peruvian Guano.	Cid	9.65	.96	.46	1.42	1.73	1.78	16.43
5019	American Fertilizer Co., Norfolk, Va.	Amour's Slaughter House Fertilizer	Gastonia	7.46	1.00	.38	1.38	1.68	1.88	14.39
4996	Amour Fertilizer Co., Greensboro, N. C.	Asheville Packing Co's Combat Fertilizer	Asheville	6.25	.62	1.06	1.68	2.04	2.60	15.28
5008	Asheville Packing Co., Asheville, N. C.	Atlantic Special Wheat Fertilizer	Clyde	7.92	1.08	.54	1.62	1.97	2.10	16.03
5107	Atlantic Chemical Co., Norfolk, Va.	Baugh's Animal Base and Potash Com-	Winston-Salem	8.05	1.04	.72	1.76	2.14	2.12	16.76
4923	Baugh & Sons Co., Philadelphia, Pa.									

pound.

5056	Bowker Fertilizer Co., Boston, Mass.....	Bowker Empire Standard Guano.....	Morganton.....	8.36	1.18	.24	1.42	7.31	1.80	15.29
5076	Brown, H. P., Guano Co., Salisbury, N. C.....	Brown's 8-2-2 Guano.....	Concord.....	7.85	.90	.66	1.55	1.89	1.80	15.42
5021	Caraleigh Phosphate & Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Guano.....	Cid.....	9.26	.70	1.00	1.70	2.07	2.26	17.73
4937	Carolina Union Fertilizer Co., Norfolk, Va.....	Carolina Union 2-8-2.....	Stony Point.....	8.25	1.00	.70	1.70	2.07	2.18	16.74
5129	Columbia Guano Co., Norfolk, Va.....	Columbia Soluble Guano.....	Henderson.....	8.04	1.04	.58	1.62	1.97	1.98	16.02
5077	General Manufacturing Co., Norfolk, Va.....	Big Crop Grower.....	Salisbury.....	8.50	.98	.70	1.68	2.04	1.96	16.67
4881	Georgia Chemical Works, Augusta, Ga.....	Georgia Formula.....	Elkin.....	6.65	1.20	.38	1.58	1.92	1.84	16.46
4939	Imperial Co., Norfolk, Va.....	Champion Guano.....	Statesville.....	8.28	1.40	.30	1.70	2.07	2.04	16.63
4940	Marietta Fertilizer Co., Greensboro, N. C.....	Marietta Solid South Guano.....	Hidolante.....	7.55	1.36	.34	1.70	2.07	2.01	15.97
4892	Miller Fertilizer Co., Baltimore, Md.....	Dissolved Bone.....	Lexington.....	7.95	1.02	.62	1.64	1.99	2.62	16.66
4948	Navassa Guano Co., Wilmington, N. C.....	Navassa Grain Fertilizer.....	Maiden.....	7.95	1.00	.56	1.56	1.89	1.96	15.67
5047	Palmetto Guano Co., Columbia, S. C.....	Palmetto Special Fertilizer.....	Lincolnton.....	7.61	1.06	.48	1.54	1.87	1.94	15.26
5012	Patapsco Guano Co., Baltimore, Md.....	Sea Gull Ammoniated Guano.....	Statesville.....	8.48	1.80	.28	2.08	2.53	2.06	18.42
6122	Powhatan Chemical Co., Richmond, Va.....	Magie Tobacco Grower.....	Mt. Airy.....	8.08			1.74	2.11	1.98	16.56
5013	Rasin Monumental Co., Baltimore, Md.....	Empire Guano.....	Mooreville.....	9.15	1.04	.18	1.52	1.85	1.70	16.32
4979	Reidsville Fertilizer Co., Reidsville, N. C.....	Banner Fertilizer.....	King.....	7.87	1.26	.40	1.66	2.02	2.20	16.25
4915	Richmond Guano Co., Richmond, Va.....	Premium Brand Fertilizer.....	Shelby.....	8.01	.98	.86	1.81	2.24	2.00	16.91
5032	Robertson Fertilizer Co., Norfolk, Va.....	Double Dollar Soluble Guano.....	Gibsonville.....	7.56	1.12	.62	1.74	2.11	2.20	16.31
4997	Royster, F. S., Guano Co., Norfolk, Va.....	Farmers Bone Fertilizer.....	Lincolnton.....	8.05	1.01	.60	1.64	1.99	2.12	16.35
5000	do.....	Royster's Special Wheat Fertilizer.....	Kings Mountain.....	8.02	1.28	.66	1.91	2.36	2.22	17.39
5088	Southern Cotton Oil Co., Shelby, N. C.....	Double Two.....	Shelby.....	6.99	.78	.74	1.52	1.85	2.32	14.99
5015	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Red Steer Standard Grade Guano.....	Statesville.....	7.55	.56	.90	1.46	1.78	2.31	15.27
5090	Tennessee Chemical Co., Greensboro, N. C.....	Ox Fertilizer.....	Concord.....	7.98	.98	.56	1.54	1.87	1.94	15.59
5043	Tuscarora Fertilizer Co., Greensboro, N. C.....	Tuscarora Standard.....	Faith.....	7.51	1.24	.32	1.54	1.87	1.92	15.15
5079	Union Guano Co., Winston-Salem, N. C.....	Fish Brand Ammoniated Guano.....	High Point.....	10.09	.84	.66	1.50	1.82	1.98	17.36
4917	do.....	do.....	Waco.....	7.90	1.00	.64	1.64	1.99	1.92	15.92
4981	do.....	Old Honesty Guano.....	King.....	8.44	.98	.64	1.62	1.97	2.08	16.48
5049	Venable Fertilizer Co., Richmond, Va.....	Planners Bone Fertilizer.....	Claremont.....	8.05	1.00	.74	1.74	2.11	2.10	16.65
4959	Va.-Car. Chemical Co., Richmond, Va.....	Allison & Addison's Anchor Brand Fer- tilizer.....	Mooreville.....	8.00	1.16	.46	1.62	1.97	1.64	15.64
5104	do.....	Allison & Addison's Old Hickory Guano.....	Whiteville.....	6.15	1.36	.56	1.92	2.33	2.18	15.78
4924	do.....	Davie & Whittle's Owl Brand Guano.....	Southmont.....	8.53	.98	.68	1.66	2.02	2.02	16.67
4918	do.....	Durham Fert. Co.'s Genuine Bone and Peruvian Guano.....	Lincolnton.....	7.83	.84	.66	1.54	1.87	1.98	15.49
4919	do.....	Owl Brand Guano.....	Lawndale.....	8.07	1.18	.46	1.64	1.99	2.02	16.17
5100	do.....	Tinsley, J. G. & Co.'s Stonewall Guano.....	Raleigh.....	8.52	1.04	.51	1.58	1.92	1.58	15.88
4883	do.....	Travers, S. W., & Co., Beef, Blood & Bone Fertilizer.....	N. Wilkesboro.....	9.04	1.00	.58	1.58	1.92	2.08	16.85
5022	do.....	Travers, S. W., & Co., National Fertilizer.....	Thomasville.....	9.06	1.20	.50	1.70	2.07	2.22	17.51

## ANALYSES OF COMMERCIAL FERTILIZERS—Continued.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash Total
4973	Va.-Car. Chemical Co., Richmond, Va.— <i>Con.</i>	V. C. C. Co's Farmers Favorite Fertilizer	Tabor	8.40	1.38	.74	2.12	2.58	2.02
	<b>Brand claiming</b>			8.00			1.65	2.00	3.00
5059	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union Guano	Gilkey	9.41	2.36	.44	2.80	3.40	1.84
	<b>Brand claiming</b>			8.00			1.85	2.25	4.00
4980	Tennessee Chemical Co., Greensboro, N. C.	Surry County Tobacco Prize Winner	Mt. Airy	7.51	1.10	.66	1.76	2.14	3.80
	<b>Brands claiming</b>			8.00			2.06	2.50	2.00
5078	Lister's Agricultural Chemical Co., Newark, N. J.	Lister's Ammoniated Dissolved Bone Phosphate.	Concord	7.99	1.88	.38	2.26	2.75	1.96
4968	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano	Vineland	9.08	1.34	.52	1.86	2.26	2.24
	<b>Brands claiming</b>			8.00			2.06	2.50	3.00
4882	Patapasco Guano Co., Baltimore, Md.	Uniflor Guano	N. Wilkesboro	8.68	1.54	.28	1.82	2.21	2.46
4970	Va.-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co's North Carolina Farmers Alliance Official Guano.	Vineland	8.75	1.74	.42	2.16	2.63	2.90
	<b>Brands claiming</b>			8.00			2.47	3.00	3.00
5045	American Agricultural Chemical Co., New York, N. Y.	Detrick's Victory Cotton Fertilizer	Conover	8.48	1.74	.28	2.02	2.46	2.82
5085	do	Lazaretto Challenge Fertilizer	Shelby	8.21	1.92	.28	2.20	2.67	3.06
4931	Armour's Fertilizer Works, Wilmington, N. C.	Brown's 8-3-3 Fertilizer	Salisbury	8.10	.76	1.66	2.42	2.94	2.78
5041	do	Armour's No. 833 Fertilizer	Salisbury	7.59	1.80	.30	2.10	2.55	2.80
5069	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co's Corn and Vegetable Special.	Asheville	7.61	.68	1.26	1.94	2.36	3.32
4967	Baugh & Sons Co., Philadelphia, Pa.	Baugh's Grand Rapids High Grade Guano	Tabor	8.05	1.86	.54	2.40	2.92	2.62
5075	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's 8-3-3 Guano.	Concord	8.04	1.46	.98	2.44	2.97	2.42
4938	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 3-8-3	Stony Point	8.11	1.32	.96	2.28	2.77	2.84
5085	Columbia Guano Co., Norfolk, Va.	Olympia Cotton Guano.	Marion	8.36	1.40	1.02	2.42	2.94	2.92
4901	General Manufacturing Co., Norfolk, Va.	Tobacco Special.	Salisbury	8.84	1.90	.34	2.24	2.77	2.28
5102	Navassa Guano Co., Wilmington, N. C.	Navassa Standard Meal Guano.	Chadbourn	8.89	1.58	.64	2.22	2.70	2.70



5097	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington High Grade.	Wallace	7.20	1.10	1.46	2.56	3.11	3.86	21.09
5110	Patapasco Guano Co., Baltimore, Md.	Choctaw Guano.	Statesville	8.32	1.82	2.34	2.16	2.63	3.00	19.57
5136	Pocomoke Guano Co., Norfolk, Va.	Monarch Tobacco Guano.	do.	8.25	1.56	.52	2.08	2.53	2.72	18.88
5001	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer.	Kings Mountain	8.75	1.16	.94	2.10	2.55	3.34	20.03
4998	Royster, F. S., Guano Co., Norfolk, Va.	Marlboro High Grade F. S. R.	Lincolnton	8.02	1.74	.72	2.46	2.99	3.08	20.63
5121	Swift Fertilizer Works, Atlanta, Ga.	Swift's Ruralist High Grade Guano.	High Point	7.09	.66	1.22	1.88	2.29	2.74	17.02
5016	Union Guano Co., Winston-Salem, N. C.	Union Homestead Guano.	Statesville	7.20	1.70	.36	2.38	2.89	4.36	20.81
4949	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's A. A. Guano.	Charlotte	7.78	2.50	.46	2.96	3.60	3.26	22.69
5064	do.	Durham Fertilizer Co's, Gold Medal	Lattimore	9.69	1.56	.46	2.02	2.46	2.82	20.02
		Brand Guano.								
4971	do.	Norfolk & Carolina Chemical Co's High Grade Manure.	Vaneeboro.	8.58	2.12	.44	2.56	3.11	3.08	21.55
4974	do.	V. C. C. Co's Menhaden Fish and Meal Mixture.	Tabor.	8.69	1.88	1.00	2.88	3.50	3.58	23.50
5098	do.	Va.-Car. Chemical Co's Royal High Grade Fertilizer.	Raleigh.	8.48	1.24	.56	1.80	2.19	2.58	17.77
	<b>Brand claiming</b>									
4975	Armour Fertilizer Works, Greensboro, N. C.	Armour's No. 836 Fertilizer.	Mt. Airy.	8.00			2.47	3.00	6.00	23.57
	<b>Brands claiming</b>									
5103	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Fertilizer.	Chadbourn.	7.48	.94	1.24	2.18	2.65	5.12	20.76
4969	N. C. Cotton Oil Co., Wilmington, N. C.	Wilmington Truck Grower.	do.	8.00			3.29	4.00	4.00	25.02
	<b>Brand claiming</b>									
6113	General Manufacturing Co., Norfolk, Va.	Special Mixture.	Salisbury.	8.06	.68	2.50	3.18	3.87	4.48	25.09
	<b>Brands claiming</b>									
5031	American Fertilizer Co., Norfolk, Va.	American Bone Mixture.	Reidsville.	8.00			3.53	4.29	1.16	24.45
5128	Armour Fertilizer Works, Greensboro, N. C.	Armour's No. 9-1-2 Fertilizer.	Snow Hill.	9.40			.82	1.00	2.00	13.54
4891	Baugh & Sons, Co., Philadelphia, Pa.	Baugh's Grain and Grass Grower.	Lexington.	8.78	.38	.48	.86	1.05	2.00	13.51
5118	Peachontas Guano Co., Lynchburg, Va.	Planters Special.	Colfax.	9.45	.90	.44	1.34	1.63	2.00	16.13
5002	Richmond Guano Co., Richmond, Va.	Premium Wheat Grower.	Kings Mountain	7.80	.70	.18	.88	1.07	2.02	12.73
4977	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 1-9-2 Guano.	Rural Hall.	9.34	.16	.80	.96	1.17	2.30	14.74
	<b>Brands claiming</b>									
5055	American Agricultural Chemical Co., New York, N. Y.	Detrick's Grain and Grass Compound.	Landis.	9.62	.54	.38	.92	1.12	2.04	14.56
	do.	Mogal Fertilizer.	Shelby.	9.00			.82	1.00	3.00	14.54
5083	do.	Zell's Hustler Phosphate.	Davidson.	9.30	.54	.22	.76	.92	2.90	14.46
5008	Armour Fertilizer Works, Greensboro, N. C.	Armour's No. 913 Fertilizer.	China Grove.	8.86	.50	.20	.70	.85	2.88	13.79
5106	Atlantic Chemical Co., Norfolk, Va.	Atlantie Grain Guano.	Clyde.	8.83	.54	.24	.78	.95	2.88	14.19
4914	Baugh & Sons Co., Philadelphia, Pa.	Baugh's Peninsula Grain Product.	Waco.	8.86	.30	.54	.84	1.02	2.88	14.38
4899	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's 9-1-3 Guano.	Richfield.	8.65	.32	.50	.82	1.00	2.92	14.15
				9.34	.42	.40	.82	1.00	2.34	14.19
				9.29	.56	.36	.92	1.12	3.04	15.26

## ANALYSES OF COMMERCIAL FERTILIZERS—Continued.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory	
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia		
5034	Carolina Union Guano Co., Winston-Salem, N. C.	R. S. Ammoniated Guano	Gibsonville	10.02	60	38	98	1.19	2.46	\$ 15.59
5094	Columbia Guano Co., Norfolk, Va.	Columbia Grain Grower	Marion	9.11	18	68	86	1.05	2.66	14.47
5117	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union 9-1-3 Standard Grade Guano.	Asheboro	7.86	14	98	112	1.36	3.12	14.90
5135	Marietta Fertilizer Co., Greensboro, N. C.	Marietta Fertilizer 813	Hiddenite	7.95	56	30	86	1.05	2.82	13.60
4976	Navassa Guano Co., Wilmington, N. C.	Long's Wheat and Grass Guano	Walnut Cove	9.46	46	38	84	1.02	2.98	15.02
5120	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Grain Fertilizer	Winston-Salem	8.93	64	28	92	1.12	2.56	14.46
5011	Patapsco Guano Co., Baltimore, Md.	Coon Brand Guano	Statesville	8.95	88	22	110	1.34	3.32	15.99
5062	Rasin Monumental Co., Baltimore, Md.	Rasin I. X. L. Fertilizer	Ellenboro	8.89			82	1.00	3.86	15.30
5063	Robertson Fertilizer Co., Norfolk, Va.	Robertson's 1-9-3 Guano	do.	8.76	58	38	96	1.17	3.14	15.06
4999	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Grain Guano	Kings Mountain	9.13	46	46	92	1.17	3.08	15.16
4916	Southern Cotton Oil Co., Shelby, N. C.	Special Grain Grower	Cherryville	8.98	64	54	118	1.43	2.62	15.66
5070	Swift's Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Guano	Hendersonville	8.63	42	64	106	1.29	3.12	15.34
5127	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Fertilizer Co's 9-1-3	do.	8.70	28	48	76	.92	2.82	13.84
4957	Union Guano Co., Winston-Salem, N. C.	B. S. Ammoniated Guano	Cornelius	9.35	96	36	132	1.61	3.02	16.98
5050	Venable Fertilizer Co., Richmond, Va.	Majestic Grain Guano	Claremont	8.80	12	72	76	.92	3.44	14.55
6121	Va.-Car. Chemical Co., Richmond, Va.	Bigelow's Crop Guano	Mount Airy	9.72			78	.95	3.31	15.36
4920	do.	do.	Lawndale	8.76	56	36	92	1.12	3.52	15.27
4946	do.	V. C. C. Co's McCormick's Wheat and Grain Guano.	Waynesville	8.27	56	36	92	1.12	2.84	14.15
Brand claiming				9.00			1.00	1.22	2.00	14.30
4978	Robertson Fertilizer Co., Norfolk, Va.	Robertson's Blood and Bone Mixture	Mt. Airy	9.08	80	38	118	1.43	2.08	15.21
Brand claiming				9.00			1.00	1.22	3.00	15.30
5056	Tidewater Guano Co., Norfolk, Va.	Tidewater 9-1-3	Concord	8.60	66	40	106	1.29	3.08	15.27

4905	<b>Brand claiming</b> V <sub>2</sub> -Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Guano	Waynesville.	9.00	1.18	1.65	2.00	1.00	16.03
5130	<b>Brands claiming</b> Georgia Chemical Works, Augusta, Ga.	Good as Gold Guano.	Saw Mills.	9.03	.34	1.52	1.85	1.18	15.74
5089	Southern Cotton Oil Co., Shelby, N. C.	Razen.	Shelby.	8.03	.28	1.65	2.00	3.00	18.03
4958	Union Guano Co., Winston-Salem, N. C.	Farmers Blood and Bone Guano.	Cornelius.	8.05	.92	1.68	2.04	2.78	17.78
				8.75	1.26	1.10	2.02	2.46	18.67
	<b>Brand claiming</b>			9.00	.38	1.64	1.99	2.90	17.66
4991	Navassa Guano Co., Wilmington, N. C.	Navassa High Grade Guano.	Graham.	9.40	1.10	2.47	3.00	3.00	21.47
	<b>Brands claiming</b>			10.00	.34	1.44	1.75	2.32	16.83
5126	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co's Fertilizer	Asheville.	8.37	.52	1.65	2.00	2.00	17.93
5060	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Guano.	Gilkey.	8.29	.84	1.62	2.14	2.60	18.68
5048	Swift Fertilizer Works, Atlanta, Ga.	Swift's Eagle Standard Grade Guano.	Conover.	10.12	.02	1.84	1.86	2.26	15.88
5137	Tennessee Chemical Co., Greensboro, N. C.	Ox Slaughter House Bone Guano.	Dallas.	10.55	1.12	1.76	2.14	2.20	19.09
5071	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Standard.	Black Mountain.	7.73	1.22	1.56	1.89	2.00	15.51
5138	V <sub>2</sub> -Car. Chemical Co., Richmond, Va.	Special Mixture.	Worth.	10.41	1.90	2.34	2.84	2.54	21.74
	<b>Brand claiming</b>			8.00	.44	2.34	2.84	2.54	11.20
4987	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co's Special Bone and Potash.	Asheville.	9.91				4.00	12.48
	<b>Brands claiming</b>			10.00				2.00	11.00
5066	American Agricultural Chemical Co., New York, N. Y.	Canton Chemical Co's Soluble Phosphate and Potash.	Ellenboro.	9.40				2.42	10.88
5142	do.	Lazaretto Alkaline Bone.	Shelby.	9.81				1.92	10.75
4886	do.	Zell's Bone and Potash.	Elkin.	11.15				1.74	11.77
6120	Armour Fertilizer Works, Greensboro, N. C.	Armour's Phosphate and Potash No. 1.	Forest City.	9.74				1.88	10.65
5037	do.	do.	Liberty.	9.68				1.64	10.35
4952	American Fertilizer Co., Norfolk, Va.	Dissolved Bone and Potash for Corn and Wheat.	Charlotte.	10.47				1.92	11.34
4986	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co's Special X. X. X. Wheat Grower.	Asheville.	9.78				2.08	10.88
5132	Atlantic Chemical Co., Norfolk, Va.	Atlantic 10 and 2 Bone and Potash Mixture.	Hickory.	10.96				2.00	11.86
4988	Baugh & Sons Co., Norfolk, Va.	Baugh's Soluble Alkaline Superphosphate.	Craggy.	10.26				1.90	11.13
5086	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Bone and Potash Mixture.	Burlington.	9.88				1.42	10.31
5024	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Electric Bone and Potash Mixture.	Cid.	10.95				1.82	11.67
4944	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 10-2.	Stony Point.	9.69				1.60	10.32
5110	Farmers Guano Works, Dillard, Ga.	Small Grain Compound.	Franklin.	12.56				1.94	13.24
4885	Georgia Chemical Works, Augusta, Ga.	Bone and Potash.	N. Wilkesboro.	10.55				2.18	11.67

## ANALYSES OF COMMERCIAL FERTILIZERS—Continued.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
5081	Imperial Guano Co., Norfolk, Va.....	Virginia Grain Mixture.....	Star.....	9.90				1.90	\$ 10.81
4992	do.....	Bone and Potash.....	Mebane.....	9.94				1.86	10.81
4912	Lister's Agricultural Chemical Co., New York, N. Y.....	Lister's Dissolved Bone and Potash.....	Stony Point.....	9.71				2.31	11.08
4941	Marietta Fertilizer Co., Greensboro, N. C.....	Marietta Dissolved Bone and Potash.....	Hiddenite.....	9.59				1.82	10.45
4984	Miller Fertilizer Co., Baltimore, Md.....	Clinch Phosphate.....	Mount Airy.....	9.89				1.98	10.88
4964	Navassa Guano Co., Wilmington, N. C.....	Navassa Dissolved Bone with Potash.....	Mooreville.....	10.28				1.70	10.95
5139	do.....	Navassa Piedmont Wheat Grower.....	Lincolnton.....	9.49				2.54	11.08
4884	Norfolk Fertilizer Co., Norfolk, Va.....	Oriana Bone and Potash.....	Hoosier Siding.....	10.65				2.06	11.64
4904	Old Buck Guano Co., Richmond, Va.....	Old Buck Hartford Bone and Potash.....	Norwood.....	10.25				2.02	11.24
4894	Palmetto Guano Co., Columbia, S. C.....	Palmetto Bone and Potash Mixture.....	Lexington.....	11.43				1.80	12.09
4935	Patapasco Guano Co., Baltimore, Md.....	Patapasco Soluble Phosphate and Potash.....	Julian.....	11.96				1.16	11.92
5091	Powhatan Chemical Co., Richmond, Va.....	Bone and Potash Mixture.....	Concord.....	10.61				1.80	11.35
4951	Rasin Monumental Co., Baltimore, Md.....	Bone and Potash.....	Cornelius.....	10.88				2.12	11.91
5125	Reidsville Fertilizer Co., Reidsville, N. C.....	do.....	Asheboro.....	10.18				2.62	11.78
5003	Richmond Guano Co., Richmond, Va.....	Bone and Potash Mixture.....	King's Mountain.....	10.10				2.28	11.37
5035	Robertson Fertilizer Co., Norfolk, Va.....	Level Run Dissolved Bone and Potash.....	Gibsonville.....	9.67				1.76	10.46
5004	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's 10-2 Bone and Potash Mixture.....	Lincolnton.....	10.38				2.02	11.36
5051	Southern Cotton Oil Co., Charlotte, N. C.....	Magnolia B. P. Standard Bone and Potash.....	Catawba.....	10.89				1.34	11.14
4983	Swift Fertilizer Works, Atlanta, Ga.....	Farmers Union Bone and Potash.....	King.....	8.96				1.94	10.00
4910	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Field and Farm Standard Grade Phosphate and Potash.....	Bryson City.....	10.24				1.76	10.98
4945	Tennessee Chemical Co., Greensboro, N. C.....	Ox Potash.....	Taylorsville.....	9.66				1.68	10.37
6119	Tidewater Guano Co., Norfolk, Va.....	Bully Boy Dissolved Bone and Potash.....	Concord.....	9.96				1.84	10.80
4909	Tuscarora Fertilizer Co., Greensboro, N. C.....	Tuscarora Golden Grain Grower.....	Craggy.....	9.33				1.90	10.30

5023	.....do.....	Tuscarora Bone and Potash.....	Cid.....	9.65	.....	1.92	10.60
4963	Union Guano Co., Winston-Salem, N. C.....	Union Bone and Potash.....	Cornelius.....	10.47	.....	1.92	11.34
4962	Va.-Car. Chemical Co., Richmond, Va.....	Allison & Addison's B. & P. Potash Mixture.....	Mooreville.....	10.26	.....	1.52	10.75
4982	.....do.....	Allison & Addison's Metjavicks Special Potash Mixture.....	Mt. Airy.....	11.04	.....	2.25	12.20
4925	.....do.....	Davie & Whittle's Owl Brand Acid Phosphate with Potash.....	South Mount.....	11.58	.....	2.16	12.58
4911	.....do.....	Durham Fertilizer Co's Blue Ridge Wheat Grower.....	Waynesville.....	10.21	.....	1.64	10.83
4893	.....do.....	Durham Fertilizer Co's Bone and Potash Mixture.....	Mocksville.....	11.37	.....	2.22	12.45
4961	.....do.....	Old Dominion Alkaline Bone and Potash	Bostic.....	10.87	.....	2.00	11.78
4936	.....do.....	Southern Chemical Co's Mammoth Wheat and Grass Grower.....	Siler City.....	11.92	.....	1.72	12.45
4994	.....do.....	J. G. Tinsley & Co's Bone and Potash Mixture.....	Graham.....	9.65	.....	1.84	10.52
5112	.....do.....	S. W. Travers & Co's Capital Acid Phosphate Compound.....	Honiny.....	11.27	.....	2.32	12.46
4960	.....do.....	S. W. Traver's Capital Bone and Potash Compound.....	Rutherfordton.....	10.58	.....	1.78	11.30
<b>Brands claiming</b>							
6115	Brown, H. P., Guano Co., Salisbury, N. C.....	Brown's 10-4 Bone and Potash.....	Ridfield.....	10.00	.....	4.00	13.00
5017	.....do.....	.....do.....	Ridfield.....	11.02	.....	3.10	13.02
6116	Carolina Union Fertilizer Co., Norfolk, Va.....	Carolina Union 10-4.....	Statesville.....	10.68	.....	3.38	12.99
6118	Cooperative Warehouse Co., Salisbury, N. C.....	Farmers Union 10-4.....	Richfield.....	10.22	.....	3.76	12.96
5080	General Manufacturing Co., Norfolk, Va.....	Potash and Soluble Bone.....	Concord.....	12.28	.....	2.30	13.35
4905	Nayassa Guano Co., Wilmington, N. C.....	Nayassa Dissolved Bone with Potash.....	Salisbury.....	11.36	.....	2.80	13.02
4926	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Farmers Home High Grade Phosphate and Potash.....	Ridfield.....	8.69	.....	3.93	11.80
			.....do.....	10.31	.....	2.36	11.64
5057	Tidewater Guano Co., Norfolk, Va.....	Dianch Brand Bone and Potash Compound.....	Concord.....	10.11	.....	3.74	12.84
<b>Brand claiming</b>							
6114	General Manufacturing Co., Norfolk, Va.....	Potash and Soluble Bone.....	Salisbury.....	10.00	.....	6.00	15.00
<b>Brands claiming</b>							
5065	Amour Fertilizer Works, Greensboro, N. C.....	Amour's Phosphate Potash Fertilizer.....	Rutherfordton.....	10.05	.....	1.80	10.84
5123	Cooperative Warehouse Co., Salisbury, N. C.....	Farmers Union 12-2 Bone and Potash.....	Ashboro.....	10.87	.....	2.28	12.06
5109	Farmers Guano Works, Dillard, Ga.....	Special for Wheat.....	Franklin.....	12.40	.....	2.00	13.16
5141	Georgia Chemical Works, Augusta, Ga.....	Georgia 12-2 Bone and Potash.....	Morganton.....	13.80	.....	1.14	13.56

ANALYSES OF COMMERCIAL FERTILIZERS—Continued.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
5143	Old Buck Guano Co., Richmond, Va.	Old Buck High Grade Phosphate and Potash	do.	11.75					1.62
5124	Rasin Monumental Co., Baltimore, Md.	Rasin's Bone and Potash	Ashboro.	12.10					1.96
5072	Swift Fertilizer Works, Atlanta, Ga.	Swift's Atlantic High Grade Phosphoric Acid	Hendersonville.	12.83					1.32
5140	Tennessee Chemical Co., Greensboro, N. C.	Alkaline Bone	Dallas.	12.01					1.94
5092	Tidewater Guano Co., Norfolk, Va.	Tidewater 12-2 Bone and Potash	Concord.	12.26					1.82
5052	Union Guano Co., Winston-Salem, N. C.	Union 12-2 Bone and Potash	Conover.	13.36					1.64
4912	Va.-Car. Chemical Co., Richmond, Va.	Buyers Mixture	Waynesville.	11.55					2.22
5096	do.	V. C. C. Co.'s Special Mixture	Iron.	11.69					1.92
	<b>Brand claiming</b>			12.00					12.14
5122	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union 12-4 Bone and Potash	Winston-Salem.	12.24					4.00
	<b>Brands claiming</b>			14.00					2.76
4943	Carolina Union Guano Co., Norfolk, Va.	Carolina Union 14-2	Stony Point.	15.00					2.00
5114	Robertson Fertilizer Co., Norfolk, Va.	Robertson's 14-2	Shelby.	14.00					1.84
5093	Tidewater Guano Co., Norfolk, Va.	Tidewater 14-2	Concord.	14.54					2.08
	<b>Brands claiming</b>			15.00					1.84
5108	Armour Fertilizer Works, Atlanta, Ga.	Armour's Phosphate and Potash	Franklin.	14.75					2.00
5111	Royster, F. S., Guano Co., Norfolk, Va.	Royster Guano Co.'s Bone and Potash Mixture.	do.	14.86					1.88
	<b>Brand claiming</b>								2.00
4927	Baugh & Sons Co., Norfolk, Va.	Baugh's Pure Dissolved Animal Bone	Winston-Salem.	13.00			2.06	2.50	20.35
				16.69			2.26	2.75	24.51

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
<b>Brand claiming</b>									
5082	Richmond Guano Co., Richmond, Va.	Old Homestead Dissolved Bone	High Point	12.00					\$ 9.60
<b>Brands claiming</b>									
5026	Rasin Monumental Co., Baltimore, Md.	Rasin's 13% Acid Phosphate	Denton	13.80					11.04
4808	Richmond Guano Co., Richmond, Va.	Premium Dissolved Bone	Mocksville	13.00					10.40
4889	Va.-Car. Chemical Co., Richmond, Va.	Norfolk & Carolina Chemical Co's Norfolk Best Acid Phosphate.	Elkin	14.56					11.65
5030	do.	Va.-Car. Chemical Co's 13% Acid Phosphate.	Thomasville	13.12					10.50
				14.30					11.44
<b>Brands claiming</b>									
5025	Baugh & Sons Co., Philadelphia, Pa.	Baugh's High Grade Phosphate	Denton	14.65					11.72
5114	Beta Fertilizer Works, Beta, N. C.	Beta Special Acid Phosphate	Beta	14.00					11.20
5067	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union 14% Acid Phosphate	Gilkey	15.43					12.34
5018	Navassa Guano Co., Wilmington, N. C.	Navassa 14% Acid Phosphate	Statesville	14.32					11.62
4888	Norfolk Fertilizer Co., Norfolk, Va.	Oriana 14% Acid Phosphate	Hoosier Landing	13.43					10.74
5054	Palmetto Guano Corporation, Columbia, S.C.	Palmetto Acid Phosphate	Hickory	14.90					11.92
4955	Pocomoke Guano Co., Norfolk, Va.	Peerless Acid Phosphate	Maiden	13.36					11.85
4807	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14% Acid Phosphate	Lexington	15.26					10.69
5074	Swift Fertilizer Works, Atlanta, Ga.	Swift's Cultivator High Grade Acid Phosphate.	Clyde	13.90					11.12
				13.33					12.74
5028	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Acid Phosphate	Cid	13.85					11.08
4929	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand High Grade Dissolved Bone.	South Mount	15.22					12.15
<b>Brand claiming</b>									
5073	Swift Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Hendersonville	15.00					12.00
				13.08					12.06
<b>Brands claiming</b>									
4895	Acme Manufacturing Co., Wilmington, N. C.	16% Acid Phosphate	Lexington	16.00					12.80
				17.27					13.82

ANALYSES OF COMMERCIAL FERTILIZERS—Continued.  
RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
5053	American Agricultural Chemical Co., New York, N. Y.	Lazaretto 16% Acid Phosphate.	Hickory	16.81					\$ 13.45
4965	do	Zell's 16% Acid Phosphate	Mooresville	15.83					12.66
4953	American Fertilizer Works, Norfolk, Va.	American High Grade Acid Phosphate.	Charlotte	17.08					13.66
6117	Armour Fertilizer Works, Greensboro, N. C.	Armour's 16% Acid Phosphate.	Gastonia	16.49					13.19
5006	do	do	do	15.53					12.42
4913	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co's 16% Acid Phosphate.	do	16.27					13.02
5134	Atlantic Chemical Co., Norfolk, Va.	Atlantic High Grade 16% Acid Phosphate.	Hickory	16.92					13.54
4990	Baugh & Sons Co., Norfolk, Va.	Baugh's 16% Acid Phosphate	Craggy	16.37					13.02
5115	Beta Fertilizer Works, Beta, N. C.	Beta Special Acid Phosphate 16%	Beta	15.81					12.65
5038	Bryant Fertilizer Co., Alexandria, Va.	Bryant's 16% Acid Phosphate.	Burlington	16.22					12.98
5039	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 16%	Liberty	16.72					13.38
5133	Columbia Guano Co., Norfolk, Va.	Columbia High Grade 16% Acid Phosphate.	Granite Falls	16.65					13.32
4906	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union 16% Acid Phosphate.	Salisbury	16.09					12.87
4887	Georgia Chemical Works, Augusta, Ga.	High Grade Dissolved Bone Phosphate.	N. Wilkesboro	16.13					13.09
4954	Imperial Co., Norfolk, Va.	High Grade Tennessee Acid Phosphate.	Statesville	16.03					12.82
4966	Navassa Guano Co., Wilmington, N. C.	Navassa 16% Acid Phosphate.	Mooresville	16.28					13.02
4907	Old Buck Guano Co., Richmond, Va.	Old Buck 16% Acid Phosphate.	Norwood	16.95					13.56
4896	Palmetto Guano Co., Columbia, S. C.	Palmetto Acid Phosphate.	Lexington	16.07					12.86
4995	Patapsco Guano Co., Baltimore, Md.	Florida Soluble Phosphate.	Roxboro	16.89					13.51
4956	Pocomoke Guano Co., Norfolk, Va.	Superb Acid Phosphate 16%	Maiden	16.88					13.50
5027	Rasin Monumental Co., Baltimore, Md.	Rasin's 16% Acid Phosphate.	Denton	16.87					13.50
5007	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate.	King's Mountain	15.98					12.78
6111	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade 16% Acid Phosphate	Lincolnton	16.32					13.06
4921	Southern Cotton Oil Co., Shelby, N. C.	Royster's High Grade 16% Acid Phosphate	Cherryville	16.48					13.18



4928	Swift Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Richfield	16.55				13.24
5058	Tidewater Guano Co., Norfolk, Va.	Top Rail Acid Phosphate.	Concord	16.70				13.36
4985	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Acid Phosphate.	Ararat	16.16				12.93
4989	Union Guano Co., Winston-Salem, N. C.	Union 16% Acid Phosphate.	Marshall	17.31				13.85
4947	Va.-Car. Chemical Co., Richmond, Va.	Atlantic & Va. Fertilizer Co's Eureka Acid Phosphate.	Ashville	16.50				13.20
4930	do	Davie & Whittle's Owl Brand High Grade Dissolved Bone.	South Mount	16.09				12.87
5029	do	Durham Fertilizer Co's Best Acid Phosphate.	Thomasville	16.78				13.42
5044	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co's Cornet Acid Phosphate.	Salisbury	17.05				13.61
5113	do	S. W. Travers & Co's Champion Acid Phosphate.	Holmby	16.71				13.39
5005	do	Va.-Car. Chemical Co's 16% Acid Phosphate.	Iron	16.52				13.22
4922	do	Va. State Fertilizer Co's Bull Run Acid Phosphate.	Lincolnton	17.23				13.78
4890	<b>Brand claiming</b> Va.-Car. Chemical Co., Richmond, Va.	V. C. C. Co's Concentrate Acid Phosphate.	N. Wilkesboro	24.89	24.00			19.20 19.91

## II. BRANDS REGISTERED—SEASON 1914-1915

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>American Coal Products Co., New York City—</i>			
Arcadian Sulphate of Ammonia .....	....	20.75	....
<i>Geo. L. Arps &amp; Co., Norfolk, Va.—</i>			
Arps' High Grade 16% Acid Phosphate.....	16.00	....	....
Arps' 14% Acid Phosphate .....	14.00	....	....
Arps' 10-4 Bone and Potash Mixture.....	10.00	....	4.00
Arps' 10-2 Bone and Potash Mixture.....	10.00	....	2.00
Arps' Go-a-Head Guano for Truck, Cotton and Tobacco .....	8.00	3.30	4.00
Arps' Premium Guano for Cotton, Tobacco, and all Spring Crops .....	8.00	1.65	2.00
Arps' Big Yield Guano .....	8.00	1.65	2.00
Arps' Quick Growth for All Crops .....	8.00	2.47	3.00
Arps' Standard Truck Guano .....	7.00	4.12	5.00
Arps' Potato Guano .....	6.00	5.76	5.00
Arps' Scuppernong Guano for Truck .....	6.00	4.12	7.00
Arps' High Grade Top Dresser .....	....	8.22	3.00
Genuine German Kainit .....	....	....	12.00
<i>American Fertilizer Co., Norfolk, Va.—</i>			
Bone Meal .....	22.50	3.71	....
American High Grade Acid Phosphate.....	16.00	....	....
Coweta 16% Acid Phosphate .....	16.00	....	....
High Grade Acid Phosphate.....	14.00	....	....
Coweta High Grade Acid Phosphate .....	14.00	....	....
Eagle Brand Acid Phosphate.....	13.00	....	....
Coweta Acid Phosphate .....	13.00	....	....
Acid Phosphate .....	12.00	....	....
Double Extra Bone and Potash.....	12.00	....	5.00
American Formula for Wheat and Corn....	10.00	....	5.00
Double Dissolved Bone and Potash.....	10.00	....	4.00
Dissolved Bone and Potash for Corn and Wheat .....	10.00	....	2.00
American Standard Cotton Grower.....	10.00	1.65	2.00
Coweta Fish Guano .....	10.00	1.65	2.00
Coweta High Grade Bone and Potash.....	10.00	....	5.00
Coweta Standard Bone and Potash .....	10.00	....	4.00
Coweta Dissolved Bone and Potash .....	10.00	....	2.00
Captain Crop Grower .....	9.00	.83	3.00
Special Formula Guano for Yellow Leaf Tobacco .....	9.00	2.88	5.00
Pitt County Special Fertilizer.....	9.00	2.88	5.00
American Excelsior Guano .....	9.00	1.65	3.00
Capital King Cotton Grower .....	9.00	2.26	2.00
American Bone Mixture .....	9.00	.83	2.00
Coweta Beef, Blood and Bone .....	9.00	2.06	1.00
Coweta Nonpareil Grain Grower .....	9.00	.83	3.00
Bone and Peruvian Guano.....	9.17	1.65	2.00
American Special Potash Mixture for Wheat .....	8.00	....	4.00
American Champion Tobacco Grower .....	8.00	2.47	3.00
Peruvian Mixture .....	8.50	1.65	1.50
Blood and Bone Compound .....	8.50	2.06	1.00
Tip Top Tobacco Grower .....	8.00	2.47	5.00
American Nonpareil Tobacco Grower.....	8.00	3.29	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
N. S. & S. C. Cotton Grower .....	8.00	3.29	4.00
Peruvian Mixture Guano, especially prepared for Sweet Potatoes .....	8.00	3.29	5.00
J. G. Miller & Co.'s Yellow Leaf Fertilizer....	8.00	2.47	3.00
American Eagle Guano .....	8.00	2.47	3.00
Bob White Fertilizer for Tobacco.....	8.00	2.06	2.50
American No. 1 Fertilizer .....	8.00	2.06	3.00
American No. 2 Fertilizer .....	8.00	1.65	2.00
Bone and Peruvian Guano .....	8.00	1.65	2.00
A. L. Hannah's Special Formula .....	8.00	1.65	2.00
Coweta Animal Bone .....	8.00	3.29	4.00
Seabird Standard Guano .....	8.00	2.47	3.00
Coweta Perfection Tobacco Grower .....	8.00	2.47	3.00
Coweta Success Guano .....	8.00	1.65	2.00
Coweta Royal Guano .....	8.00	2.06	3.00
Coweta Special Bone and Potash .....	8.00	....	4.00
Standard 7% Ammonia Guano .....	7.00	5.76	5.00
American Irish Potato Grower .....	7.00	4.12	5.00
Special Potato Guano .....	7.00	4.12	7.00
Excelsior Peanut Guano .....	7.00	1.65	3.00
Stable Manure Substitute .....	7.00	2.47	4.00
American Fish Scrap Guano.....	7.00	3.29	4.00
Ten Per Cent Ammonia Guano .....	7.00	8.24	2.50
American 7-7-7 for Irish Potatoes .....	7.00	5.76	7.00
Special Potato Manure.....	6.00	4.12	7.00
Coweta Standard Truck Guano .....	6.00	4.12	7.00
Cotton Seed Meal .....	6.17	....	....
American Standard Top Dresser.....	4.00	8.24	4.00
Coweta Genuine German Kainit .....	....	....	12.00
Nitrate of Soda .....	....	14.83	....
Muriate of Potash .....	....	....	.49
American High Grade Top Dresser.....	....	7.41	3.00
Genuine German Kainit .....	....	....	12.00
Cotton Seed Meal .....	....	6.17	....
Ground Fish Scrap .....	....	8.24	....
Nitrate of Soda .....	....	14.83	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	49.00

*Acme Manufacturing Co., Wilmington, N. C.—*

16% Acid Phosphate .....	16.00	....	....
Acme High Grade Acid Phosphate .....	14.00	....	....
Acme Bone and Potash .....	12.00	....	2.00
Acme Bone and Potash .....	12.00	....	3.00
Acme Bone and Potash .....	12.00	....	4.00
Acme Bone and Potash .....	12.00	....	5.00
Acme Bone and Potash .....	12.00	....	6.00
Acme Bone and Potash .....	11.00	....	2.00
Acme Bone and Potash .....	11.00	....	3.00
Acme Bone and Potash .....	11.00	....	4.00
Acme Bone and Potash .....	11.00	....	5.00
Acme Bone and Potash .....	11.00	....	6.00
Acme Melon Grower .....	10.00	3.30	5.00
Acme Bone and Potash .....	10.00	....	2.00
Acme Bone and Potash .....	10.00	....	3.00
Acme Bone and Potash .....	10.00	....	4.00
Acme Bone and Potash .....	10.00	....	5.00
Acme Bone and Potash .....	10.00	....	6.00
Acme Cotton Grower .....	9.00	2.27	2.00
Acme Square Deal Fertilizer .....	9.25	1.65	2.00
Acme Square Deal Fertilizer for Tobacco....	9.25	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Acme Premo Guano .....	9.00	.82	3.00
Acme Special Fertilizer for Cotton .....	8.00	4.12	7.00
Acme Special Fertilizer for Tobacco .....	8.00	4.12	7.00
Acme Plumb Good Fertilizer .....	8.00	3.30	6.00
Acme Plumb Good Fertilizer for Tobacco...	8.00	3.30	6.00
Quick Step Fertilizer .....	8.00	3.30	4.00
Quick Step Fertilizer for Tobacco .....	8.00	3.30	4.00
Acme "OK" Fertilizer .....	8.00	3.30	4.00
Acme "OK" Fertilizer for Tobacco .....	8.00	3.30	4.00
Acme King Bee Fertilizer .....	8.00	3.30	4.00
Acme Gloria Fertilizer for Tobacco .....	8.00	2.47	7.00
Acme Bonanza Fertilizer for Tobacco .....	8.00	2.87	3.50
Acme Crop Grower .....	8.00	2.47	4.00
Acme Crop Grower for Tobacco .....	8.00	2.47	4.00
Currie's High Grade Fertilizer .....	8.00	2.47	4.00
Acme Aristo Guano .....	9.00	2.47	3.00
Pee Dee Special Fertilizer .....	8.00	2.47	3.00
Pee Dee Special Fertilizer for Tobacco....	8.00	2.47	3.00
Best's Fish Scrap Guano .....	8.00	2.47	3.00
Best's Fish Scrap Guano for Tobacco .....	8.00	2.47	3.00
Acme 8-3-3 C. S. M. Guano .....	8.00	2.47	3.00
Acme 8-3-3 C. S. M. Guano for Tobacco ....	8.00	2.47	3.00
Acme Wizard Guano .....	8.00	2.47	3.00
Acme Wizard Guano for Tobacco .....	8.00	2.47	3.00
Acme Fertilizer .....	8.00	2.47	2.50
Acme Fertilizer for Tobacco .....	8.00	2.47	2.50
Acme Plant Food .....	8.00	2.47	2.50
Acme Plant Food for Tobacco .....	8.00	2.47	2.50
Acme Merito Mixture .....	8.00	2.06	4.00
Tip Top Tobacco Grower .....	8.00	2.06	3.00
Tip Top Corn Grower .....	8.00	2.06	3.00
Latimer's Complete Fertilizer .....	8.00	2.06	2.00
Best's Complete Fertilizer .....	8.00	2.06	2.00
Acme Standard Guano .....	8.00	2.06	2.00
Gem Fertilizer .....	8.00	1.65	2.00
Gem Fertilizer for Tobacco .....	8.00	1.65	2.00
Acme Special Grain Fertilizer .....	8.00	1.65	2.00
Cotton Seed Meal Guano .....	8.00	1.65	2.00
Cotton Seed Meal Guano for Tobacco .....	8.00	1.65	2.00
Acme Bone and Potash .....	8.00	....	4.00
Acme Bone and Potash .....	8.00	....	5.00
Acme Bone and Potash .....	8.00	....	6.00
Acme Root Crop Guano .....	7.00	4.12	7.00
Acme Standard Truck Guano .....	7.00	4.12	5.00
Acme Vindex Fertilizer .....	7.00	3.30	5.00
Acme High Grade Guano .....	6.00	4.94	8.00
Acme Truck Grower .....	6.00	3.30	8.00
Acme Corn Guano .....	6.00	2.47	3.00
Acme Special 4-10-4 Guano .....	4.00	8.24	4.00
Dried Ground Fish .....	4.00	8.22	....
Clark's Corn Guano .....	1.00	6.58	10.00
Acme Top Dresser .....	....	7.40	3.00
Genuine German Kainit .....	....	....	12.00
High Grade German Kainit 16% .....	....	....	16.00
Sulphate of Potash .....	....	....	48.00
Muriate of Potash .....	....	....	48.00
Sulphate of Ammonia .....	....	20.56	....
Nitrate of Soda .....	....	14.81	....
Dried Ground Blood .....	....	11.51	....
Cotton Seed Meal .....	....	6.17	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>A. D. Adair &amp; McCarty Bros., Inc., Atlanta, Ga.—</i>			
Adair's H. G. Dissolved Bone, No. 16 .....	16.00	....	....
A. & M 15-4 .....	15.00	....	4.00
Adair's A. & M. 15-2 .....	15.00	....	2.00
Adair's H. G. Dissolved Bone .....	14.00	....	....
A. & M. 13-4 .....	13.00	....	4.00
McCarty's Potash Formula, No. 5 .....	12.00	....	5.00
McCarty's Potash Formula, No. 4 .....	12.00	....	4.00
McCarty's Potash Formula .....	12.00	....	2.00
Adair's Dissolved Bone .....	12.00	....	....
David Harum Extra High Grade Guano....	10.00	3.30	4.00
Adair's High Grade Blood and Bone Guano	10.00	2.47	3.00
Adair's Special Wheat Compound .....	10.00	1.65	4.00
Adair's Special Corn Compound .....	10.00	1.65	4.00
Adair's Special Vegetable Compound .....	10.00	1.65	4.00
Adair's Special Potato Compound .....	10.00	1.65	4.00
Adair's Special Cotton Compound .....	10.00	1.65	4.00
Adair's Special Tomato Compound .....	10.00	1.65	4.00
Adair's Soluble Pacific Guano .....	10.00	1.65	2.00
Old Time Fish Scrap Guano .....	10.00	1.65	2.00
McCarty's High Grade Corn Grower (C. S. M.) .....	10.00	1.65	2.00
McCarty's High Grade Cotton Grower (C. S. M.) .....	10.00	1.65	2.00
McCarty's Wheat Special .....	10.00	.82	3.00
McCarty's Corn Special .....	10.00	.82	3.00
McCarty's Cotton Special .....	10.00	.82	3.00
Adair's H. G. Potash Compound, No. 10 ...	10.00	....	10.00
Adair's H. G. Potash Compound, No. 8 ....	10.00	....	8.00
Adair's Wheat and Corn Grower, No. 8 ....	10.00	....	8.00
Adair's Wheat and Corn Grower, No. 6 ....	10.00	....	6.00
Adair's Wheat and Corn Grower, No. 5 ....	10.00	....	5.00
Adair's Wheat and Corn Grower .....	10.00	....	4.00
Adair's H. G. Potash Compound, No. 6 ....	10.00	....	6.00
Adair's H. G. Potash Compound, No. 5 ....	10.00	....	5.00
Adair's Formula .....	10.00	....	2.00
Dixie High Grade Soil Food .....	9.00	1.65	3.00
Adair's Blood, Bone and Tankage Guano ...	9.00	.82	2.00
Adair's High Grade Special Corn Grower..	8.00	1.65	6.00
Adair's High Grade Special Wheat Grower..	8.00	1.65	6.00
Adair's High Grade Special Potato Grower..	8.00	1.65	6.00
Adair's High Grade Special Vegetable Grower	8.00	1.65	6.00
McCarty's Special Corn Grower .....	8.00	1.65	2.00
Planters Soluble Fertilizer (C. S. M.) .....	8.00	1.65	2.00
Adair's Ammoniated Dissolved Bone .....	8.00	1.65	2.00
Golden Grain Compound .....	8.00	.82	3.00
Adair's Special Potash Mixture, No. 6 ....	8.00	....	6.00
Adair's Special Potash Mixture, No. 5 .....	8.00	....	5.00
Nitrate of Soda .....	....	15.00	....
Muriate of Potash .....	....	....	50.00

*The Atlantic Chemical Corporation, Norfolk, Va.—*

Pure Raw Bone Meal .....	Total	21.50	3.71	....
Acco Thomas Phosphate .....	Total	17.00	....	....
Atlantic High Grade 16% Acid Phosphate..		16.00	....	....
Atlantic 14% Acid Phosphate .....		14.00	....	....
Atlantic Dissolved Bone .....		13.00	....	....
Atlantic Corn Special .....		12.00	1.02	2.00
Atlantic Acid Phosphate .....		12.00	....	....
Atlantic 11-5 Bone and Potash Mixture ....		11.00	....	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Atlantic Chemical Corporation, Norfolk, Va.—</i>			
Atlantic Bone and Potash Mixture .....	12.00	....	2.00
Atlantic 10-5 Bone and Potash Mixture ....	10.00	....	5.00
Atlantic 10-4 Bone and Potash Mixture ....	10.00	....	4.00
Atlantic Bone and Potash Mixture for Grain	10.00	....	3.00
Atlantic Bone and Potash Mixture .....	10.00	....	2.00
Acco Tobacco Compound .....	9.00	2.47	3.00
Atlantic Meal Compound .....	9.00	2.27	2.00
Atlantic Cotton Grower .....	9.00	2.06	1.00
Corona Cotton Compound .....	9.00	1.65	3.00
Atlantic Special Guano .....	9.00	1.65	1.00
Atlantic Grain Guano .....	9.00	.82	3.00
Atlantic Fish Guano .....	9.00	.82	3.00
Atlantic Special 9-1-2 Guano .....	9.00	.82	2.00
Otter Tobacco Guano .....	8.00	2.88	5.00
Bearpond Special Tobacco Guano .....	8.00	2.47	3.00
Atlantic Special Truck Guano .....	8.00	3.30	4.00
Wigwam High Grade Guano .....	8.00	3.30	4.00
Paloma Tobacco Guano .....	8.00	3.30	4.00
Pitt Co. Light Tobacco Special .....	8.00	2.47	5.00
Boone's Special .....	8.00	2.47	4.00
Atlantic High Grade Tobacco Guano .....	8.00	2.47	3.00
Atlantic High Grade Cotton Guano .....	8.00	2.47	3.00
Atlantic Tobacco Grower .....	8.00	2.06	3.00
Atlantic Tobacco Compound .....	8.00	2.06	2.00
Atlantic Soluble Guano .....	8.00	1.65	2.00
Atlantic Soluble Guano for Tobacco .....	8.00	1.65	2.00
Atlantic Special Wheat Fertilizer .....	8.00	1.65	2.00
Bugle Peanut Guano .....	8.00	1.02	4.00
Atlantic 8-5 Bone and Potash Mixture ....	8.00	....	5.00
Atlantic 8-4 Bone and Potash Mixture ....	8.00	....	4.00
Atlantic 7% Truck Guano .....	7.00	5.77	7.00
Acco Potato Manure .....	7.00	4.12	7.00
Atlantic Potato Guano .....	7.00	4.12	5.00
Lighthouse Peanut Grower .....	7.00	....	5.00
Acco 7% Trucker .....	6.00	5.77	5.00
Atlantic Special Potato Guano .....	6.00	4.12	7.00
Atlantic Ground Tankage .....	6.00	8.23	....
Atlantic Bamboo Truck Fertilizer .....	6.00	4.12	5.00
Acco 10% Truck Guano .....	5.00	8.22	3.00
Oceana Trucker .....	5.00	8.22	2.50
Vito Truck Grower .....	5.00	5.77	5.00
Atlantic Side Dresser .....	4.00	8.22	4.00
Atlantic Special Top Dresser .....	4.00	6.18	2.50
Nitrate of Soda .....	....	15.22	....
Atlantic Top Dresser .....	....	7.42	3.00
Cotton Seed Meal .....	....	6.17	....
Sulphate of Potash .....	....	....	48.00
Muriate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00

*Armour Fertilizer Works, Chicago, Greensboro  
and Wilmington.—*

Bone Meal .....	Total	24.00	2.47	....
Raw Bone Meal .....	Total	22.00	3.70	....
Thomas Phosphate .....	Total	17.00	....	....
Acid Phosphate .....		17.00	....	....
Acid Phosphate .....		16.00	....	....
Phosphate and Potash .....		15.00	....	2.00
Star Phosphate .....		14.00	....	....
Phosphate and Potash .....		13.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Golden Grain Grower .....	13.00	....	4.00
Acid Phosphate .....	13.00	....	....
Phosphate and Potash .....	12.00	....	4.00
Phosphate and Potash .....	12.00	....	10.00
Phosphate and Potash .....	12.00	....	6.00
Phosphate and Potash .....	12.00	....	5.00
Phosphate and Potash .....	12.00	....	2.00
Acid Phosphate .....	12.00	....	....
Fertilizer, No. 1233 .....	12.00	2.47	3.00
Fertilizer, No. 1134 .....	11.00	2.47	4.00
Phosphate and Potash .....	11.00	....	1.00
Sampson's Corn Mixture .....	11.00	....	5.00
Fertilizer, No. 1011 .....	10.00	.82	1.00
Fertilizer, No. 1012 .....	10.00	.82	2.00
Fertilizer, No. 1013 .....	10.00	.82	3.00
Fertilizer, No. 1043 .....	10.00	3.30	3.00
Fertilizer, No. 1042 .....	10.00	3.30	2.00
Special Tobacco Formula .....	10.00	3.50	6.25
Fertilizer, No. 1045 .....	10.00	3.30	5.00
Fertilizer, No. 1044 .....	10.00	3.30	4.00
Fertilizer, No. 1033 .....	10.00	2.47	3.00
Fertilizer, No. 1032 .....	10.00	2.47	2.00
Fertilizer, No. 1025 .....	10.00	1.65	5.00
Fertilizer, No. 1023 .....	10.00	1.65	3.00
Hartman's Animal Bone .....	10.00	1.65	3.00
Armour's Wheat Grower .....	10.00	1.65	2.00
Ammoniated Dissolved Bone and Potash ....	10.00	1.65	2.00
Special Mixture .....	10.00	1.03	6.00
Armour's Special Guano .....	10.00	.82	3.00
Phosphate and Potash .....	10.00	....	10.00
Phosphate and Potash .....	10.00	....	6.00
Superphoric Acid and Potash .....	10.00	....	5.00
Superphosphate and Potash .....	10.00	....	4.00
Acid and Potash .....	10.00	....	3.00
Phosphate and Potash, No. 1 .....	10.00	....	2.00
Fertilizer, No. 932 .....	9.00	2.47	2.00
Fertilizer, No. 931 .....	9.00	2.47	1.00
Fertilizer, No. 933 .....	9.00	2.47	3.00
Fertilizer, No. 921 <sup>1</sup> / <sub>4</sub> .....	9.00	1.85	4.00
Fertilizer, No. 921 <sup>1</sup> / <sub>3</sub> .....	9.00	1.85	3.00
Fertilizer, No. 920 <sup>2</sup> / <sub>2</sub> .....	9.20	1.65	2.00
Fertilizer, No. 957 .....	9.00	4.11	7.00
Fertilizer, No. 934 .....	9.00	2.47	4.00
African Cotton Grower .....	9.00	2.47	3.00
Armour's Tobacco Champion .....	9.00	2.47	3.00
Johnson's High Grade .....	9.00	2.05	5.00
Carolina Special .....	9.00	2.05	3.00
Forsyth Co. Tobacco Special .....	9.00	2.05	3.00
Tobacco Fertilizer .....	9.00	1.85	4.00
Tobacco Fertilizer .....	9.00	1.65	5.00
Fertilizer, No. 925 .....	9.00	1.65	5.00
Fertilizer, No. 924 .....	9.00	1.65	4.00
Armour's Bright Tobacco Grower .....	9.00	1.65	3.00
Bone, Dissolved Bone with Potash .....	9.00	1.65	3.00
Fertilizer, No. 913 .....	9.00	.82	3.00
Fertilizer, No. 912 .....	9.00	.82	2.00
Fertilizer, No. 922 .....	9.00	1.65	2.00
Armour's Phosphate and Potash .....	9.00	....	3.00
Truck Fertilizer .....	8.00	5.76	5.00
Phosphate and Potash .....	8.00	....	6.00
Fertilizer, No. 875 .....	8.00	5.76	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Fertilizer, No. 843 .....	8.00	3.30	3.00
Fertilizer, No. 831 .....	8.00	2.47	1.00
Fertilizer, No. 821 <sub>21</sub> .....	8.00	2.05	1.00
Tobacco Fertilizer .....	8.50	1.65	2.00
Standard Cotton Grower .....	8.50	1.65	2.00
Blood, Bone and Potash .....	8.00	4.11	7.00
Young's Special .....	8.00	4.11	3.00
Van Lindley's Special .....	8.00	4.11	2.00
Fertilizer, No. 846 .....	8.00	3.30	6.00
Fertilizer, No. 845 .....	8.00	3.30	5.00
Fertilizer, No. 844 .....	8.00	3.30	4.00
Armour's Tobacco Grower .....	8.00	3.30	4.00
Special Trucker .....	8.00	3.30	4.00
Truck and Berry Special .....	8.00	2.47	10.00
Fertilizer, No. 837 .....	8.00	2.47	7.00
Armour's 836 for Tobacco .....	8.00	2.47	6.00
Fertilizer, No. 836 .....	8.00	2.47	6.00
Special for Tobacco .....	8.00	2.47	5.00
Fertilizer, No. 835 .....	8.00	2.47	5.00
Fertilizer, No. 834 .....	8.00	2.47	4.00
Underwood's Favorite .....	8.00	2.47	3.00
Cotton Special .....	8.00	2.47	3.00
Tobacco Special .....	8.00	2.47	3.00
Fertilizer, No. 833 .....	8.00	2.47	3.00
Fertilizer, No. 832 .....	8.00	2.47	2.00
Berry King .....	8.00	2.05	4.00
Fertilizer, No. 821 <sub>23</sub> .....	8.00	2.05	3.00
Sweet Potato Special .....	8.00	2.05	3.00
Gold Medal for Tobacco .....	8.00	2.05	3.00
Champion .....	8.00	2.05	2.50
King Cotton .....	8.00	2.05	2.00
Slate's Tobacco Special .....	8.00	1.85	4.00
High Grade Potato .....	8.00	1.65	10.00
Stokes Co. Tobacco Special .....	8.00	1.65	5.00
Fruit and Root Crop Special .....	8.00	1.65	5.00
Fertilizer, No. 825 .....	8.00	1.65	5.00
Fertilizer, No. 824 .....	8.00	1.65	4.00
Fertilizer, No. 823 .....	8.00	1.65	3.00
Carolina Cotton Special .....	8.00	1.65	3.00
Slaughter House for Tobacco .....	8.00	1.65	2.00
Armour's Slaughter House Fertilizer .....	8.00	1.65	2.00
General .....	8.00	1.65	2.00
Fertilizer, No. 815 .....	8.00	.82	5.00
Fertilizer, No. 814 .....	8.00	.82	4.00
Fertilizer, No. 813 .....	8.00	.82	3.00
Fertilizer, No. 826 .....	8.00	1.65	6.00
Phosphate and Potash, No. 2 .....	8.00	....	5.00
Phosphate and Potash, No. 3 .....	8.00	....	4.00
Armour's Extra Trucker .....	7.00	5.76	7.00
Fertilizer, No. 758 .....	7.00	4.11	8.00
Fertilizer, No. 743 .....	7.00	3.30	3.00
Allen's Tobacco Special .....	7.00	4.11	8.00
Armour's Trucker .....	7.00	4.11	5.00
Fertilizer, No. 633 .....	6.00	2.47	3.00
Armour's 7% Trucker .....	6.00	5.76	5.00
Armour's 5% Trucker .....	6.00	4.11	7.00
Fertilizer, No. 648 .....	6.00	3.30	8.00
Fertilizer, No. 647 .....	6.00	3.30	7.00
Manure Substitute .....	6.00	3.30	4.00
Armour's Velvet Leaf for Tobacco .....	6.00	2.47	7.00
Fertilizer, No. 637 .....	6.00	2.47	7.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Fertilizer, No. 544 .....	5.00	3.30	4.00
Fertilizer, No. 533 .....	5.00	2.47	3.00
10% Trucker .....	5.00	8.23	3.00
Armour's Top Dresser .....	5.00	8.23	2.00
Pitt County Special Tobacco .....	4.00	3.30	6.00
Armour's Top Dresser .....	4.00	8.23	4.00
Armour's Top Dresser .....	4.00	6.18	2.50
Special Formula for Tobacco .....	4.00	3.30	5.00
Fertilizer, No. 444 .....	4.00	3.30	4.00
Harris' Electric Top Dresser .....	2.00	8.23	3.00
Armour's Top Dresser .....	....	7.81	4.00
Armour's Top Dresser .....	....	7.40	3.00
Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00
Nitrate of Soda .....	....	14.81	....
Dried Blood .....	....	13.16	....
10% Tankage .....	....	8.23	....
Cotton Seed Meal .....	....	6.18	....
Sulphate of Ammonia .....	....	20.00	....
Cyanamid .....	....	16.46	....

*American Agricultural Chemical Co., Ashepool Fertilizer Works, Charleston, S. C.—*

Ashepool High Grade Dissolved Phosphate..	16.00	....	....
Ashepool Potash Acid Phosphate .....	10.00	....	2.00
Ashepool Bird Guano .....	9.00	2.46	2.00
Ashepool Standard Fertilizer .....	9.00	1.85	1.00
Palmetto Guano .....	9.00	1.65	3.00
Eutaw Standard Guano .....	9.00	1.65	2.00
Harvest Moon Grain Grower .....	9.00	.82	3.00
Buckeye Grain Guano .....	9.00	.82	2.00
B. D. Sea Fowl Guano .....	9.00	2.38	3.00
B. D. Sea Fowl Guano for Tobacco .....	9.00	2.38	3.00
Bradley's Patent Superphosphate .....	9.00	1.85	1.00
Bradley's Grain Grower .....	9.00	.82	2.50
Ashepool Bird and Fish Guano .....	8.00	2.46	3.00
Pacific Tobacco Guano .....	8.00	2.46	3.00
Golden Meal Mixture .....	8.00	2.46	3.00
Eutaw Tobacco Special .....	8.00	2.06	3.00
Eutaw Standard for Tobacco .....	8.00	1.65	2.00
Ashepool Standard Guano .....	8.00	1.65	2.00
Bradley's High Grade Meal Mixture .....	8.00	2.46	3.00
Pine Island Tobacco Guano .....	8.00	2.06	3.00
Bradley's Standard for Tobacco .....	8.00	1.65	2.00
Bradley's Standard Guano .....	8.00	1.65	2.00
Nitrate of Soda .....	....	14.81	....

*American Agricultural Chemical Co.—*

Bradley's High Grade Dissolved Phosphate	16.00	....	....
Dixie Acid Phosphate .....	16.00	....	....
Red Rooster Acid Phosphate .....	16.00	....	....
Homestead Acid Phosphate .....	16.00	....	....
Superphosphate .....	16.00	....	....
Detrick's 16% Acid Phosphate .....	16.00	....	....
Lazaretto's 16% Acid Phosphate .....	16.00	....	....
Zell's 16% Acid Phosphate .....	16.00	....	....
16% Acid Phosphate .....	16.00	....	....
Dixie Acid Phosphate .....	14.00	....	....
Red Rooster Acid Phosphate .....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Homestead Acid Phosphate .....	14.00	....	....
14% Acid Phosphate .....	14.00	....	....
Special XXX Phosphate and Potash .....	14.00	....	2.00
Detrick's XX Acid Phosphate .....	14.00	....	....
Detrick's Special Victory Alkaline Bone ....	14.00	....	2.00
Lazaretto's Dissolved Phosphate .....	14.00	....	....
Zell's Dissolved Phosphate .....	14.00	....	....
Zell's High Grade Phosphate and Potash ....	14.00	....	2.00
14% Acid Phosphate.....	14.00	....	....
13% Acid Phosphate .....	13.00	....	....
Bone and Potash Mixture .....	12.00	....	2.00
Canton Chemical Special Soluble Alkaline Phosphate .....	12.00	....	2.00
Detrick's High Grade Bone and Potash....	12.00	....	2.00
Lazaretto's High Grade Phosphate and Potash	12.00	....	2.00
Zell's High Grade Phosphate and Potash..	12.00	....	2.00
High Grade Bone and Potash .....	10.00	....	4.00
Bradley's Standard Wheat Grower .....	10.00	....	2.00
Dixie Bone and Potash .....	10.00	....	2.00
Dixie Cotton Grower .....	10.00	1.65	3.00
Dixie Blood, Bone and Potash .....	10.00	2.47	2.00
Dixie Money Maker Fertilizer .....	10.00	1.85	3.00
Dixie Fertilizer .....	10.00	2.47	3.00
Dixie Fertilizer .....	10.00	1.65	2.00
Dixie Fertilizer .....	10.00	3.30	2.00
Red Rooster Bone and Potash .....	10.00	....	2.00
Red Rooster Cotton Grower .....	10.00	1.65	3.00
Red Rooster Blood, Bone and Potash ....	10.00	2.47	2.00
Red Rooster Money Maker Fertilizer .....	10.00	1.85	3.00
Red Rooster Fertilizer .....	10.00	2.47	3.00
Red Rooster Fertilizer .....	10.00	1.65	2.00
Red Rooster Fertilizer .....	10.00	3.30	2.00
Homestead Bone and Potash .....	10.00	....	2.00
Homestead Cotton Grower .....	10.00	1.65	3.00
Homestead Blood, Bone and Potash .....	10.00	2.47	2.00
Homestead Money Maker Fertilizer .....	10.00	1.85	3.00
Homestead Fertilizer .....	10.00	2.47	3.00
Homestead Fertilizer .....	10.00	1.65	2.00
Homestead Fertilizer .....	10.00	3.30	2.00
Canton Chemical Soluble Phosphate and Pot- ash .....	10.00	....	2.00
Detrick's Bone and Potash .....	10.00	....	2.00
Lazaretto's Dissolved Phosphate and Potash	10.00	....	2.00
Zell's Bone and Potash .....	10.00	....	2.00
Dixie Beats all Fertilizer .....	9.20	1.65	2.00
Dixie Blood and Bone .....	9.00	1.65	3.00
Dixie Fertilizer .....	9.00	2.47	2.00
Dixie Fertilizer .....	9.00	2.47	3.00
Red Rooster Beats all Fertilizer .....	9.20	1.65	2.00
Red Rooster Blood and Bone .....	9.00	1.65	3.00
Red Rooster Fertilizer .....	9.00	2.47	2.00
Red Rooster Fertilizer .....	9.00	2.47	3.00
Homestead Beats all Fertilizer .....	9.20	1.65	2.00
Homestead Blood and Bone .....	9.00	1.65	3.00
Homestead Fertilizer .....	9.00	2.47	2.00
Homestead Fertilizer .....	9.00	2.47	3.00
Universal Crop Grower .....	9.00	.82	3.00
Canton Chemical Baker's Special Wheat, Corn and Grass Mixture .....	9.00	1.03	2.00
Canton Chemical Golden Harvest Animal Bone Mixture .....	9.00	1.85	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Detrick's Grain and Grass Compound.....	9.00	.82	3.00
Detrick's Reliance Animal Bone Compound..	9.00	1.85	3.00
Detrick's Special Kangaroo Komplete Kom- pound for Tobacco .....	9.00	2.47	3.00
Reese's Special Pacific Guano for Tobacco ...	9.00	2.47	2.00
Lazaretto's Special Retriever Animal Bone Fertilizer .....	9.00	1.85	3.00
Zell's Hustler Phosphate .....	9.00	.82	3.00
Zell's Empire Cotton Compound .....	9.00	1.65	3.00
Zell's Special Victoria Animal Bone Com.	9.00	1.85	3.00
Holmes and Dawson's Special .....	9.00	1.65	2.00
Holmes and Dawson's Productive Cotton and Peanut Grower .....	9.00	2.26	2.00
Dixie Fertilizer .....	8.00	1.65	2.00
Dixie Farmers Favorite .....	8.00	2.47	3.00
Red Rooster Fertilizer .....	8.00	1.65	2.00
Red Rooster Farmers Favorite .....	8.00	2.47	3.00
Homestead Fertilizer .....	8.00	1.65	2.00
Homestead Farmers Favorite .....	8.00	2.47	3.00
Regal Crop Grower .....	8.00	.82	3.00
Top Notch C. S. M Compound .....	8.00	1.65	2.00
Eureka C. S. M. Compound .....	8.00	2.47	3.00
Canton Chemical Game Guano .....	8.00	1.65	2.00
Canton Chemical Baker's Fish Guano .....	8.00	1.65	2.00
Canton Chemical Superior High Grade Ferti- lizer .....	8.00	2.47	3.00
Canton Chemical Baker's Tobacco Fertilizer	8.00	2.47	3.00
Canton Chemical Gladiator Cotton Fertilizer	8.00	2.47	3.00
Canton Chemical Special Bone Tobacco Ferti- lizer .....	8.00	3.29	3.00
Detrick's Fish Mixture .....	8.00	1.65	2.00
Detrick's Royal Crop Grower .....	8.00	1.65	2.00
Detrick's Rival Tobacco Compound .....	8.00	1.65	2.00
Detrick's Vegetator Ammoniated Superphos- phate .....	8.00	2.06	3.00
Detrick's Kangaroo Komplete Compound Bright Tobacco Grower .....	8.00	2.47	3.00
Detrick's Victory Cotton Fertilizer .....	8.00	2.47	3.00
Detrick's Kangaroo Komplete Kompound for Cotton .....	8.00	2.47	3.00
Detrick's Kangaroo Komplete Kompound Spe- cial High Grade Revised .....	8.00	3.29	3.00
Reese's Pacific Guano .....	8.00	1.65	2.00
Slinghoff's British Mixture .....	8.00	2.06	2.50
Lazaretto's Special Peanut Grower .....	8.00	.82	3.00
Lazaretto's Crop Grower .....	8.00	1.65	2.00
Lazaretto's Climax Plant Food .....	8.00	2.06	3.00
Lazaretto's Challenge Fertilizer .....	8.00	2.47	3.00
Lazaretto's New Rival Cotton Fertilizer....	8.00	2.47	3.00
Lazaretto's Special Tobacco and Potato Fer- tilizer .....	8.00	2.47	3.00
Lazaretto's Special Carolina Cotton Food....	8.00	3.29	3.00
Zell's Calvert Guano .....	8.00	1.65	2.00
Zell's Fish Guano .....	8.00	1.65	2.00
Zell's Special Compound for Tobacco .....	8.00	1.65	2.00
Zell's Square Deal for Tobacco .....	8.00	2.06	3.00
Zell's Reliance High Grade Manure .....	8.00	2.47	3.00
Zell's Bright Tobacco Grower .....	8.00	2.47	3.00
Zell's Tobacco Fertilizer .....	8.00	2.47	4.00
Zell's Special Popular Tobacco Manure ....	8.00	3.29	3.00
Zell's Special Economizer Cotton Food .....	8.00	3.29	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Holmes and Dawson's Crop Maker .....	8.00	1.65	2.00
Holmes and Dawson's Triumph Soluble Guano .....	8.00	1.65	2.00
Holmes and Dawson's Purity Guano .....	8.00	1.65	2.00
Dixie Top Dresser .....	5.00	5.77	3.00
Red Rooster Top Dresser .....	5.00	5.77	3.00
Homestead Top Dresser .....	5.00	5.77	3.00
Ashepoo Gilt Edge Top Dresser .....	4.00	6.15	2.50
Nitrate of Soda .....	....	14.81	....
Baltimore Top Dresser .....	....	7.41	3.00
Nitrate of Soda .....	....	15.00	....

*H. P. Brown Guano Co., Salisbury, N. C.—*

Brown's Ground Phosphate Rock .....	28.00	....	....
Brown's 21.5-4.5 Bone Meal .....Total	21.50	13.70	....
Brown's 20-12 Bone and Potash .....	20.00	....	12.00
Brown's 20-8 Bone and Potash .....	20.00	....	8.00
Brown's Thos. Phosphate .....	17.00	....	....
Brown's 16% Acid Phosphate .....	16.00	....	....
High Grade Soluble Phosphate .....	16.00	....	....
Brown's 14% Acid Phosphate .....	14.00	....	....
High Grade Bone and Potash .....	14.00	....	2.00
Soluble Phosphate .....	14.00	....	....
Brown's 13% Acid Phosphate .....	13.00	....	....
Brown's Dissolved Animal Bone .....	13.00	2.06	....
Brown's 12-1 Bone and Potash .....	12.00	....	2.00
Brown's 12-4-4 Guano .....	12.00	3.29	4.00
Brown's 12-2-4 Guano .....	12.00	1.65	4.00
Brown's 12-6 Bone and Potash .....	12.00	....	6.00
Brown's 12-5 Bone and Potash .....	12.00	....	5.00
Brown's 12-4 Bone and Potash .....	12.00	....	4.00
Brown's 12-3 Bone and Potash .....	12.00	....	3.00
Brown's 12-2 Bone and Potash .....	12.00	....	2.00
Brown's 12% Acid Phosphate .....	12.00	....	....
Bone and Potash .....	12.00	....	2.00
Brown's 11-5 Bone and Potash .....	11.00	....	5.00
Brown's 10-4-4 Guano .....	10.00	3.29	4.00
Brown's 10-3-3 Guano .....	10.00	2.47	3.00
Brown's 10-2-2 Guano .....	10.00	1.65	2.00
Brown's 10-1¼-6 Guano .....	10.00	1.03	6.00
Brown's 10-1¼-4 Guano .....	10.00	1.03	4.00
Brown's 10-6 Bone and Potash .....	10.00	....	6.00
Brown's 10-5 Bone and Potash .....	10.00	....	5.00
Brown's 10-4 Bone and Potash .....	10.00	....	4.00
Brown's 10-2 Bone and Potash .....	10.00	....	2.00
Brown's 10-3 Bone and Potash .....	10.00	....	3.00
Brown's 9-1-2 Guano .....	9.00	.82	2.00
Brown's 9-3-6 Guano .....	9.00	2.47	6.00
Brown's 9-3-4 Guano .....	9.00	2.47	4.00
Brown's 9-3-3 Guano .....	9.00	2.47	3.00
Brown's 9-2¾-2 Guano .....	9.00	2.26	2.00
Brown's 9-2¼-4 Guano .....	9.00	1.85	4.00
Brown's 9-2-3 Guano .....	9.00	1.65	3.00
Brown's 9-1-3 Guano .....	9.00	.82	3.00
Brown's 8-4½-7 Guano .....	8.00	3.71	7.00
Brown's 8-4½-7 Tobacco Guano .....	8.00	3.71	7.00
Brown's 8-4-6 Guano .....	8.00	3.29	6.00
Brown's 8-4-6 Tobacco Guano .....	8.00	3.29	6.00
Brown's 8-4-4 Guano .....	8.00	3.29	4.00
Brown's 8-4-2 Guano .....	8.00	3.29	2.00
Brown's 8-3-7 Guano .....	8.00	2.47	7.00
Brown's 8-3-7 Tobacco Guano .....	8.00	2.47	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Brown's 8-3-6 Guano .....	8.00	2.47	6.00
Brown's 8-3-6- Tobacco Guano .....	8.00	2.47	6.00
Brown's 8-3-10 Guano .....	8.00	2.47	10.00
Brown's 8-3-5 Guano .....	8.00	2.47	5.00
Brown's 8-3-5 Tobacco Guano .....	8.00	2.47	5.00
Brown's 8-3-3 Guano .....	8.00	2.47	3.00
Brown's 8-3-3 Tobacco Guano .....	8.00	2.47	3.00
Brown's 8-2½-3 Guano .....	8.00	2.06	3.00
Brown's 8-2½-3 Tobacco Guano .....	8.00	2.06	3.00
Brown's 8-2½-2 Guano .....	8.00	2.06	2.00
Brown's 8-2½-2 Tobacco Guano .....	8.00	2.06	2.00
Brown's 8-2-10 Guano .....	8.00	1.65	10.00
Brown's 8-2-5 Guano .....	8.00	1.65	5.00
Brown's 8-2-5 Tobacco Guano .....	8.00	1.65	5.00
Brown's 8-2-3 Guano .....	8.00	1.65	3.00
Brown's 8-2-2 Guano .....	8.00	1.65	2.00
Brown's 8-2-2 Tobacco Guano .....	8.00	1.65	2.00
Brown's 8-1-4 Guano .....	8.00	.82	4.00
Brown's 8-1-3 Guano .....	8.00	.82	3.00
Brown's 8-5 Bone and Potash .....	8.00	....	5.00
Brown's 7-7-7 Guano .....	7.00	5.76	7.00
Brown's 7-5-8 Guano .....	7.00	4.12	8.00
Brown's 7-5-5 Guano .....	7.00	4.12	5.00
Brown's 7-4-5 Guano .....	7.00	3.29	5.00
Brown's 6-6-6 Guano .....	6.00	4.94	6.00
Brown's 6-4-7 Guano .....	6.00	3.29	7.00
Brown's 4-7½-2 Top Dresser .....	4.00	6.17	2.00
Brown's 4-4-6 Guano .....	4.00	3.29	6.00
Brown's 8-4 Bone and Potash .....	4.00	....	4.00
Brown's Tankage .....	2.00	8.24	....
Brown's 0-9-3 Top Dresser .....	....	7.40	3.00
Brown's 12% Kainit .....	....	....	12.00
Brown's Nitrate of Soda .....	....	15.00	....
Brown's Muriate of Potash .....	....	....	48.00
Brown's Sulphate of Potash .....	....	....	48.00
Brown's Fish Scrap .....	....	8.24	....
Brown's Dried Blood .....	....	13.00	....
Brown's Cotton Seed Meal .....	....	6.17	....

*Bowker Fertilizer Co., Baltimore and New York.—*

Superphosphate with Potash .....	10.00	....	....
Special White Star Compound .....	9.00	2.47	3.00
Special Corn and Grain Grower .....	8.00	.82	3.00
Empire Standard .....	8.00	1.65	2.00
Excelsior Cotton-seed Meal Mixture .....	8.00	1.65	2.00
Eureka Cotton Compound .....	8.00	2.47	3.00
Tobacco Fertilizer .....	8.00	2.47	3.00
Special Blood, Bone and Fish .....	8.00	3.29	3.00
Sulphate Tobacco Compound .....	8.00	2.47	3.00
High Grape Top Dresser .....	....	7.41	3.00

*Boykin Chemical and Fertilizer Company,  
Baltimore, Md.—*

Boykin's Top Dresser .....	....	7.43	3.00
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*The C. J. Burton Guano Co., Baltimore, Md.—*

Burton's 16% Acid Phosphate .....	16.00	....	....
Burton's 14% Acid Phosphate .....	14.00	....	....
Burton's Alkaline .....	10.00	....	4.00
Burton's Potash Mixture .....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Burton's Wheat Special .....	9.00	.82	3.00
Burton's Butcher Bone .....	8.00	1.65	2.00
Burton's Best .....	8.00	2.47	3.00
Tobacco Queen .....	8.00	2.47	3.00
Burton's High Grade Tobacco .....	8.00	3.29	4.00
Burton's Carolina Tobacco Special .....	8.00	1.65	4.00
Burton's High Grade .....	8.00	2.06	3.00
Burton's Tobacco Special .....	8.00	1.65	4.00

*S. T. Beveridge & Co., Richmond, Va.—*

Raw Ground Bone Meal .....	20.00	3.70	....
Thomas or Basic Slag .....	17.00	....	....

*Blackstone Guano Co., Inc., Blackstone, Va.—*

Clover Leaf 16% Phosphate .....	16.00	....	....
Bone and Phosphate Half and Half .....	15.00	1.65	....
B. G. Co., Inc., Acid Phosphate .....	14.00	....	....
Clover Leaf for Grain .....	13.00	1.03	1.00
B. G. Co., Inc., Bone and Potash .....	12.00	....	5.00
Dissolved Bone .....	10.00	1.03	1.00
B. G. Co., Inc., Bone and Potash .....	10.00	....	4.00
B. G. Co., Inc., Bone and Potash .....	10.00	....	2.00
Blackstone Special for Tobacco .....	9.00	2.47	3.00
Old Bellefonte .....	8.00	3.30	2.00
Clover Leaf for Tobacco .....	8.00	2.47	3.00
Tobacco Special .....	8.00	2.47	3.00
Wrapper Brand .....	8.00	2.47	3.00
Jim Crow for Tobacco .....	8.00	2.47	3.00
Bellefonte .....	8.00	2.47	2.00
Hard Cash for Tobacco .....	8.00	2.06	2.00
Standard Guano .....	8.00	1.65	2.00
Red Letter for Tobacco .....	8.00	1.65	2.00
Alliance for Tobacco .....	8.00	1.65	2.00
Leader for Tobacco .....	8.00	1.65	2.00
Peanut Special .....	8.00	1.03	6.00
Material for Special Order, Our Nitrogen....	....	4.95	....

*The Bryant Fertilizer Co., Alexandria, Va.—*

Bryant's Acid Phosphate .....	17.00	....	....
Bryant's Acid Phosphate .....	16.00	....	....
Byrant's S. C. Dissolved Bone .....	14.00	....	....
Bryant's High Grade Wheat Mixture .....	12.00	....	6.00
Parrish Godwin's Dissolved Bone with Potash .....	12.00	....	4.00
Bryant's Bone and Potash .....	10.00	....	5.00
Bryant's Bone and Potash .....	10.00	....	4.00
Bryant's Bone and Potash Mixture.....	10.00	....	2.00
Bryant's Corn Special .....	9.00	1.00	1.00
Bryant's Challenge Highest Grade Tobacco Mixture .....	9.00	2.47	3.00
Bryant's Meal Mixture .....	9.00	2.47	3.00
Bryant's Special Cotton-seed Meal Fertilizer.	9.00	2.26	2.00
Bryant's Bone Mixture for Tobacco .....	9.00	2.06	2.00
Bryant's No-Potash Meal Guano .....	8.00	2.47	....
Bryant's Wheat Mixture .....	8.00	....	4.00
Carolina Wheat and Grain Guano .....	8.00	.82	3.00
Bryant's High Grade Guano .....	8.00	3.29	4.00
Bryant's High Grade Tobacco Fertilizer ....	8.00	3.29	4.00
Bryant's High Grade Fertilizer .....	8.00	2.47	3.00
Bryant's High Grade Meal Fertilizer .....	8.00	3.29	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Bryant's Favorite C. S. M. Guano .....	8.00	2.47	3.00
Bryant's Victor Tobacco Fertilizer .....	8.00	2.47	3.00
Bryant's Choice C. S. M. 3% Mixture .....	8.00	2.47	3.00
Bryant's Tobacco Fertilizer .....	8.00	2.06	3.00
Bryant's Otter Special Tobacco Fertilizer...	8.00	2.06	3.00
Bryant's Meal Fertilizer .....	8.00	2.06	3.00
Bryant's Boll Special .....	8.00	2.47	4.00
Bryant's Cotton and Corn Fertilizer .....	8.00	2.06	2.00
Bryant's Special Fertilizer for Tobacco .....	8.00	2.06	2.00
Farmer's Mixture .....	8.75	1.85	4.00
Bryant's Cotton Grower .....	8.00	1.65	2.00
Bryant's Special Fertilizer .....	8.00	1.65	2.00
Bryant's Cotton-seed Meal Guano .....	8.00	1.65	2.00
Bryant's Potomac Bone Special for Tobacco..	8.00	1.65	2.00
Bryant's Special Formula for Grain and Grass .....	8.00	.82	4.00
Bryant's Truck Grower .....	7.00	5.76	7.00
Bryant's Fish Scrap Guano .....	7.00	3.29	4.00
Bryant's Carolina Top Dresser .....	6.00	5.76	5.00
Bryant's High Grade Top Dresser .....	4.00	8.23	4.00
Bryant's Top Dresser .....	4.00	6.17	2.50
Bryant's Special Top Dresser .....	2.00	5.76	2.50
Bryant's Carolina Special Top Dresser .....	....	7.41	3.00
Nitrate of Soda .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00
Pure Raw Bone .....	....	3.71	....
Nitrate of Soda .....	....	14.82	....
Blood .....	....	13.15	....
High Grade Tankage .....	....	8.25	....
Fish Scrap .....	....	8.24	....
Cotton-seed Meal .....	....	6.15	....

*Baugh & Sons Co., Philadelphia and Norfolk—*

Baugh's Raw Bone Meal, Warranted Pure...	21.50	3.70	....
Baugh's 16% Acid Phosphate .....	16.00	....	....
Baugh's Pure Bone and Potash Mixture ....	15.00	2.47	3.00
Baugh's High Grade Acid Phosphate .....	14.00	....	....
Baugh's Pure Dissolved Animal Bone .....	13.00	2.06	....
Baugh's 13-2 Phosphate and Potash .....	13.00	....	2.00
Baugh's Soluble Alkaline Superphosphate...	10.00	....	2.00
Baugh's Combination Animal Base Fertilizer	10.00	1.65	3.00
Baugh's Grain and Grass Grower .....	9.00	.82	2.00
Baugh's Peninsula Grain Producer .....	9.00	.82	3.00
Baugh's Grand Rapid High Grade Guano ...	8.00	2.47	3.00
Baugh's High Grade Tobacco Guano .....	8.00	2.47	3.00
Baugh's Animal Base and Potash Compound For All Crops .....	8.00	1.65	2.00
Baugh's Colonial Tobacco Guano .....	8.25	2.06	2.75
Baugh's Old Standby Compound for Tobacco.	8.00	1.65	2.00
Baugh's Wheat Fertilizer for Wheat and Grass .....	8.00	1.65	2.00
Baugh's Southern States Excelsior Guano...	8.00	1.02	3.00
Baugh's Superlative Truck Grower .....	8.00	5.76	3.00
Baugh's Three Score Complete Fertilizer ...	8.00	2.47	5.00
Baugh's Fish Bone and Potash .....	8.00	3.30	4.00
Baugh's Yucatan Special Tobacco Guano ....	8.00	3.30	4.00
Baugh's Southern States Guano for Bright Tobacco .....	7.00	2.88	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Baugh's 7% Potato Guano .....	6.00	5.76	5.00
Baugh's Farmers Friend Guano .....	6.00	4.12	5.00
War Measure Baugh's Peruvian Guano—Sub- stitute for Potatoes and All Vegetables..	6.00	4.12	5.00
Ground Fish .....	6.87	8.23	....
Baugh's New Process 10% Guano .....	5.00	8.23	2.50
High Grade Tankage .....	4.00	6.58	....
Sulphate Ammonia .....	....	20.57	....
Nitrate of Soda .....	....	15.22	....
Fine Ground Dried Blood .....	....	13.17	....
Baugh's Soluble Top Dresser for All Crops..	....	8.23	3.00
Fine Ground Dried Blood .....	....	13.17	....

*The Berkeley Chemical Co., Norfolk, Va.—*

Pure Ground Bone .....	20.00	3.70	....
Resolute Acid Phosphate .....	16.00	....	....
Berkeley Acid Phosphate .....	14.00	....	....
Berkeley Bone and Potash Mixture .....	11.00	....	2.00
Laurel Potash Mixture .....	10.00	....	2.00
Berkeley Plant Food .....	10.00	....	4.00
Berkeley Special Tobacco Guano .....	9.00	2.47	3.00
Berkeley 4-8-3 Guano .....	8.00	3.29	3.00
Berkeley 1½-8-3 Special .....	8.00	1.03	3.00
Brandon Superphosphate .....	8.00	1.65	2.00
Long Leaf Tobacco Grower .....	8.00	1.65	2.00
Monitor Special .....	9.00	1.85	3.00
Select Crop Grower .....	8.50	2.06	2.50
Advance Crop Grower .....	8.00	2.47	3.00
Berkeley Tobacco Guano .....	8.00	2.47	3.00
Berkeley 4-8-3 Special .....	8.00	3.29	3.00
Berkeley High Grade Tobacco Grower .....	8.00	3.29	4.00
Victory Special Crop Grower .....	8.00	3.29	4.00
Mascot Truck Guano .....	7.00	4.11	5.00
Royal Truck Grower .....	6.00	5.76	5.00
Berkeley Top Dresser .....	4.00	8.23	2.00
Special Top Dresser .....	....	7.41	3.00
Nitrate of Soda .....	....	15.00	....

*W. H. Camp, Petersburg, Va.—*

Camp's Yellow Head Chemical .....	8.00	2.87	7.50
Camp's Red Head Chemical .....	8.00	2.25	2.00
Camp's Green Head Chemical .....	7.00	6.15	10.00

*Columbia Guano Co., Norfolk, Va.—*

Pure Raw Bone Meal.....Total	21.50	3.71	....
Columbia Thomas Phosphate .....	17.00	....	....
Columbia High Grade 16% Acid Phosphate..	16.00	....	....
Columbia 14% Acid Phosphate .....	14.00	....	....
Columbia Dissolved Bone .....	13.00	....	....
Columbia 12-6 Bone and Potash Mixture ...	12.00	....	6.00
Columbia 12-5 Bone and Potash Mixture ...	12.00	....	5.00
Columbia 12-2 Bone and Potash Mixture ...	12.00	....	2.00
Columbia Acid Phosphate .....	12.00	....	....
Columbia 11-5 Bone and Potash Mixture ...	11.00	....	5.00
Columbia 10½-1½ Bone and Potash Mixture	10.50	....	1.50
Columbia 10-5 Bone and Potash Mixture.....	10.00	....	5.00
Columbia 10-4 Bone and Potash Mixture.....	10.00	....	4.00
Columbia Bone and Potash Mixture for Grain .....	10.00	....	3.00
Columbia Bone and Potash Mixture .....	10.00	....	2.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Hazlewood Special .....	10.00	.82	3.00
Columbia C. S. M. Special .....	9.00	2.27	2.00
Parrish's Special .....	9.00	2.06	5.00
Roanoke Ammoniated Guano .....	9.00	1.65	3.00
Carolina Soluble Guano .....	9.00	1.65	1.00
Columbia Grain Guano .....	9.00	.82	3.00
Columbia Special Sweet Potato Guano .....	8.00	2.47	3.00
Columbia Avolyn Cotton Guano .....	8.00	1.65	4.00
Columbia Roundup Guano .....	8.00	3.30	2.00
Columbia Bulldog Cotton Grower .....	8.00	2.06	3.00
Picnic Tobacco Grower .....	8.00	2.87	5.00
Columbia Special 9-1-2 Guano .....	9.00	.82	2.00
Ironclad Truck Fertilizer .....	8.00	4.12	5.00
Tobacco King .....	8.00	3.30	5.00
Steamboat Ammoniated Guano .....	8.00	3.30	4.00
Hornpipe Truck Guano .....	8.00	3.30	4.00
Trojan Tobacco Guano .....	8.00	3.30	4.00
Pendulum Special Fertilizer .....	8.00	3.30	3.00
Happy Thought Tobacco Guano .....	8.00	2.47	7.00
Yelverton Bros. Plant Food for Tobacco.....	8.00	2.47	5.00
Jubilee High Grade Guano .....	8.00	2.47	4.00
Falcon Cotton Guano .....	8.00	2.47	3.00
Hyco Tobacco Guano .....	8.00	2.47	3.00
Torpedo Tobacco Guano .....	8.00	2.06	3.00
Columbia Special Tobacco Guano .....	8.00	2.06	2.00
Pathfinder Tobacco Fertilizer .....	8.00	1.65	5.00
Columbia Fish Phosphate and Potash .....	8.00	1.65	3.00
Columbia Soluble Guano .....	8.00	1.65	2.00
Columbia Soluble Guano for Tobacco .....	8.00	1.65	2.00
Columbia Special Wheat Fertilizer .....	8.00	1.65	2.00
Spinola Peanut Grower .....	8.00	1.02	4.00
Columbia 8-4 Bone and Potash Mixture .....	8.00	....	4.00
Columbia Special 7% Truck Guano .....	7.00	5.77	7.00
Columbia Potato Manure .....	7.00	4.12	7.00
Columbia Potato Guano .....	7.00	4.12	5.00
Rapidan Special Formula .....	7.00	1.65	5.00
Bandanna Peanut Fertilizer .....	7.00	....	5.00
Shamrock Potato Guano .....	6.00	4.12	5.00
Columbia Early Sweet Potato Grower .....	6.00	3.30	5.00
Columbia 7% Potato Grower .....	6.00	5.77	5.00
Columbia Irish Potato Grower .....	6.00	4.12	7.00
Columbia 10% Truck Guano .....	5.00	8.22	3.00
Columbia Cabbage Guano .....	5.00	8.22	2.50
Clipper Truck Grower .....	5.00	5.77	5.00
Ventura Potato Producer .....	5.00	4.91	7.00
Columbia Side Dresser .....	4.00	8.22	4.00
Columbia Special Top Dresser .....	4.00	6.18	2.50
Nitrate of Soda .....	....	15.22	....
Columbia Top Dresser .....	....	7.42	3.00
Cotton-seed Meal .....	....	6.17	....
Sulphate of Potash .....	....	....	48.00
Muriate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00

*Cooper Guano Co., Wilmington, N. C.—*

Cooper's Acid Phosphate .....	16.00	....	....
Cooper's Acid Phosphate .....	14.00	....	....
Cooper's Grain Grower .....	10.00	....	2.00
Cooper's Grain Producer .....	10.00	....	4.00
Cooper's Acid with Potash .....	10.00	....	5.00
Cooper's Recorder .....	9.00	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Cooper's Grain Yielder .....	9.00	.82	3.00
Cooper's Reward C. S. M. ....	8.00	1.65	2.00
Cooper's Waccamaw .....	8.00	1.65	2.00
Cooper's Sterling Complete .....	8.00	1.65	2.00
Cooper's Bald Head Island .....	8.00	1.65	2.00
Cooper's Crusoe .....	8.00	2.06	2.00
Cooper's Potato .....	8.00	1.65	10.00
Cooper's Peanut Bouncer .....	8.00	1.00	4.00
Cooper's Zenith .....	8.00	1.65	3.00
Cooper's Bunker Hill .....	8.00	2.06	3.00
Cooper's Swamp Fox .....	8.00	2.47	2.50
Cooper's Lenox .....	8.00	2.47	3.00
Cooper's Sunset C. S. M. ....	8.00	2.47	3.00
Cooper's Clifford, for Tobacco .....	8.00	2.47	3.00
Cooper's Tobacco Special .....	8.00	2.47	7.50
Cooper's Horto C. S. M. ....	8.00	3.29	4.00
Cooper's Helmar .....	8.00	3.29	4.00
Cooper's High Grade Tobacco Special .....	8.00	3.29	6.00
Cooper's Chadbourn Trucker .....	8.00	2.47	10.00
Cooper's Kite .....	8.00	4.12	7.00
Cooper's Finis .....	7.00	4.12	5.00
Cooper's High Grade .....	7.00	4.94	5.00
Cade's Special for Cotton and Corn.....	7.00	2.47	7.00
Cooper's Bright Leaf Tobacco Special .....	6.00	3.29	10.00
Cooper's Top Dresser .....	4.00	8.23	4.00
Cooper's Evergreen Top Dresser .....	....	7.41	3.00
Cooper's Genuine German Kainit .....	....	....	12.00
Cooper's Muriate of Potash .....	....	....	48.00
Cooper's Sulphate of Potash .....	....	....	50.00
Cooper's Nitrate of Soda .....	....	14.82	....

*Chickamauga Fertilizer Works, Atlanta, Ga.—*

Chickamauga H. G. Dis. Bone, No. 16.....	16.00	....	....
Chickamauga H. G. Dis. Bone, No. 14.....	14.00	....	....
Chickamauga 13-4 .....	13.00	....	4.00
Chickamauga Potash Special .....	12.00	....	2.00
Chickamauga Potash Special, No. 4.....	12.00	....	4.00
Chickamauga H. G. Dis. Bone .....	12.00	....	....
Chickamauga Very Best Extra H. G. Guano..	10.00	3.30	4.00
Ben Hur H. G. Blood and Bone Guano .....	10.00	2.47	3.00
Chickamauga Special Corn Compound .....	10.00	1.65	4.00
Chickamauga Special Wheat Compound .....	10.00	1.65	4.00
Chickamauga Special Vegetable Compound..	10.00	1.65	4.00
Chickamauga Special Potato Compound ....	10.00	1.65	4.00
Chickamauga H. G. Fertilizer .....	10.00	1.65	4.00
Chickamauga H. G. Plant Food .....	10.00	1.65	2.00
Chickamauga Fish Scrap Guano .....	10.00	1.65	2.00
Chickamauga Wheat Special .....	10.00	.82	3.00
Chickamauga Corn Special .....	10.00	.82	3.00
Chickamauga Cotton Special .....	10.00	.82	3.00
Old Glory Mixture .....	10.00	.82	1.00
Chickamauga Wheat and Corn Grower, No. 8	10.00	....	8.00
Chickamauga Wheat and Corn Grower, No. 6	10.00	....	6.00
Chickamauga Wheat and Corn Grower, No. 5	10.00	....	5.00
Chickamauga Wheat and Corn Grower.....	10.00	....	4.00
Chickamauga Bone and Potash .....	10.00	....	2.00
Chickamauga, No. 1032 .....	10.00	2.47	2.00
Chickamauga Standard Wheat Grower .....	9.00	1.65	2.00
Chickamauga H. G. Special Potato Grower..	8.00	1.65	6.00
Chickamauga H. G. Special Wheat Grower..	8.00	1.65	6.00
Chickamauga H. G. Special Corn Grower...	8.00	1.65	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Chickamauga H. G. Vegetable Grower .....	8.00	1.65	6.00
Chickamauga Complete Fertilizer (CSM)...	8.00	1.65	2.00
Georgia Home Guano .....	8.00	1.65	2.00
Chickamauga Standard Corn Grower .....	8.00	1.65	2.00
No. 3 Bone, Tankage and Potash Mixture....	8.00	.82	3.00
Chickamauga Alkaline Bone, No. 6.....	8.00	....	6.00
Chickamauga Alkaline Bone, No. 5 .....	8.00	....	5.00
Chickamauga Alkaline Bone .....	8.00	....	4.00
Nitrate of Soda .....	....	15.00	....
Muriate of Potash .....	....	....	50.00

*Cotton States Fertilizer Works, Wilmington, N. C.,  
Chester, S. C.—*

Cotton States Acid Phosphate .....	16.00	....	....
Cotton States Acid Phosphate .....	14.00	....	....
Cotton States Potash Acid .....	13.00	....	4.00
Cotton States Cotton and Corn Fertilizer ..	12.00	2.47	2.00
Cotton States Cotton and Corn Fertilizer ...	12.00	1.65	1.00
Cotton States Cotton and Corn Fertilizer ...	11.00	2.47	2.00
Cotton States Cotton and Corn Fertilizer ...	11.00	1.65	1.00
Cotton States Cotton and Corn Fertilizer ..	10.00	3.29	4.00
Cotton States Cotton and Corn Fertilizer ..	10.00	2.47	3.00
Cotton States Cotton and Corn Fertilizer ...	10.00	1.65	4.00
Cotton States Cotton and Corn Fertilizer ...	10.00	1.65	2.00
Cotton States C. S. M. Compound .....	10.00	1.65	2.00
Cotton States Cotton and Corn Fertilizer ...	10.00	.82	3.00
Cotton States Potash Acid .....	10.00	....	4.00
Cotton States Potash Acid .....	10.00	....	2.00
Cotton States Cotton and Corn Fertilizer ...	9.00	1.65	1.00
Cotton States Cotton and Corn Fertilizer ...	9.00	2.47	3.00
Cotton States Cotton and Corn Fertilizer ...	9.00	1.65	3.00
Cotton States Tobacco Fertilizer .....	8.00	2.06	3.00
Cotton States Tobacco Fertilizer .....	8.00	2.06	2.00
Cotton States Tobacco Fertilizer .....	8.00	3.47	3.00
Cotton States Tobacco Fertilizer .....	8.00	2.06	4.00
Cotton States Tobacco Fertilizer .....	8.00	1.65	5.00
Cotton States Cotton and Corn Fertilizer....	8.00	1.65	5.00
Cotton States Tobacco Fertilizer .....	8.00	1.65	4.00
Cotton States Tobacco Fertilizer .....	8.00	1.65	2.00
Cotton States Cotton and Corn Fertilizer...	8.00	1.65	2.00
Cotton States Cotton and Corn Fertilizer ...	8.00	2.47	3.00
Cotton States Tobacco Fertilizer .....	8.00	3.29	6.00
Cotton States Cotton and Corn Fertilizer ...	8.00	3.29	4.00
Cotton States Tobacco Fertilizer .....	8.00	3.29	2.00
Cotton States Tobacco Fertilizer .....	8.00	2.47	6.00
Cotton States Potato Fertilizer .....	6.00	4.12	5.00
Cotton States Tankage .....	3.50	8.23	....
Cotton States Dried Blood .....	....	13.27	....
Cotton States German Kainit .....	....	....	12.00
Cotton States Muriate of Potash .....	....	....	50.00
Cotton States Nitrate of Soda .....	....	14.82	....

*Caraleigh Phosphate and Fertilizer Works,  
Raleigh, N. C.—*

Raw Bone Meal .....	Total	20.00	3.70	....
16% Acid Phosphate .....		16.00	....	....
Climax Dissolved Bone .....		14.00	....	....
Bone and Potash Mixture .....		14.00	....	2.00
Sterling Acid Phosphate .....		13.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Staple Acid Phosphate .....	12.00	....	....
Bone and Potash Mixture .....	12.00	....	2.00
Oak-Dale Guano-2 .....	12.00	.82	3.00
Horne & Sons H. G. B. and P. ....	11.00	....	5.00
Special Bone and Potash Mixture .....	10.00	....	4.00
Morris & Scarboro's Special B. and P. ....	10.00	....	3.00
Electric Bone and Potash .....	10.00	....	2.00
Pacific Tobacco and Cotton Grower .....	9.00	2.26	2.00
Buncombe Corn Grower .....	8.00	....	4.00
Buncombe Wheat Grower .....	8.00	....	4.00
Rhamkatte Special Tobacco Guano .....	8.00	3.29	6.00
Caraleigh Meal and Tankage Mixture .....	8.00	3.29	4.00
Special 8-4-4 .....	8.00	3.29	4.00
Horne's Best .....	8.00	2.47	3.00
Eclipse Ammoniated Guano .....	8.00	2.47	3.00
Caraleigh Formula for Tobacco .....	8.00	2.47	3.00
Planter's Pride .....	8.00	2.06	3.00
Caraleigh Special Tobacco Guano .....	8.00	2.06	3.00
Eli Ammoniated Fertilizer .....	8.00	1.65	2.00
Crown Ammoniated Guano .....	8.00	1.65	2.00
Comet Guano .....	8.00	.82	3.00
Formula 40 Guano .....	8.00	2.47	4.00
McGee's Bright Leaf Tobacco Guano .....	8.00	1.65	2.00
Oak-Dale Guano .....	8.00	2.67	3.00
Caraleigh Top Dresser .....	3.00	8.23	4.00
Nitrate of Soda .....	....	15.63	....
Kanona Tankage .....	....	9.04	....
Dried Blood .....	....	13.16	....
Ground Fish .....	....	8.22	....
Genuine German Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00

*Catawba Fertilizer Co., Lancaster, S. C.—*

Catawba H. G. Acid Phosphate .....	16.00	....	....
Catawba H. G. Acid Phosphate .....	14.00	....	....
Catawba Dixie .....	10.00	2.47	1.00
Catawba Climax .....	10.00	1.65	2.00
Catawba Preference .....	10.00	1.65	2.00
Catawba Acid and Potash .....	10.00	....	4.00
Catawba Acid and Potash .....	10.00	....	2.00
Catawba Farmers Special .....	9.00	2.47	2.00
Catawba Regulator .....	8.00	3.30	4.00
Catawba Electric .....	8.00	3.30	4.00
Catawba Red Star .....	8.00	2.47	3.00
Catawba Red Rose .....	8.00	2.47	3.00
Catawba Economizer .....	8.00	1.65	2.00
Catawba Eclipse .....	8.00	1.65	2.00
Catawba Champion .....	8.00	2.06	3.00
Catawba Standard Formula .....	8.00	2.06	3.00
Catawba Standard .....	8.00	2.06	2.00
Catawba H. G. Top Dresser .....	4.00	6.16	2.00
Catawba Kainit .....	....	....	12.00
Catawba Muriate of Potash .....	....	....	48.00
Catawba Nitrate Soda .....	....	15.00	....

*Chatham Oil Fertilizer Co., Pittsboro, N. C.—*

Rabbit Brand .....	9.00	2.00	1.00
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Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Combahee Fertilizer Co., Charleston, S. C.—</i>			
Dissolved Bone .....	16.00	....	....
Dissolved Bone .....	14.00	....	....
Acid Phosphate and Potash .....	10.00	....	2.00
Special Mixture .....	10.00	2.40	5.00
Combahee Fertilizer Co. Fish and Blood....	9.00	1.65	3.00
K. M. S. Cotton .....	8.00	3.30	4.00
High Grade Cotton .....	8.00	2.47	3.00
Cotton and Corn Compound .....	8.00	1.65	2.00
Nitrate of Soda .....	....	14.83	....

*Craven Chemical Co., New Bern, N. C.—*

Panama 16% Acid Phosphate .....	16.00	....	....
Jewel Acid Phosphate .....	14.00	....	....
Craven High Grade Bone and Potash Mixture	12.00	....	4.00
Herring Bone and Potash .....	12.00	....	5.00
Turkey Trot Bone and Potash .....	12.00	....	6.00
Craven Chemical Gem Guano .....	12.00	1.65	1.00
C. C. Co.'s 12% Acid Phosphate .....	12.00	....	....
Trent Bone and Potash .....	10.00	....	2.00
Craven Grain Compound .....	10.00	....	4.00
Foy's High Grade Bone and Potash Mixture	10.00	....	6.00
Halifax Guano .....	9.00	2.47	3.00
Prolix 9-2-3 Special Guano .....	9.00	1.65	3.00
C. C. Co. Proficient CSM .....	9.00	2.26	2.00
Selma Special Guano .....	9.00	1.86	4.00
Hanover Standard Guano .....	8.00	3.29	4.00
Currituck Sweet Potato Guano .....	8.00	2.47	6.00
C. C. Co. Standard Tobacco Guano .....	8.00	2.47	6.00
Duplin Tobacco Guano .....	8.00	2.47	3.00
Gaston High Grade Fertilizer .....	8.00	2.47	3.00
C. E. Foy's High Grade Guano .....	8.00	2.47	3.00
Marvel Great Crop Grower .....	8.00	2.06	3.00
Elite Cotton Guano .....	8.00	1.65	2.00
C. C. Co. Peanut Grower .....	8.00	.82	4.00
C. C. Co. Tobacco Guano .....	8.00	1.65	2.00
C. C. Co. Tobacco Special .....	8.00	2.47	3.00
C. C. Co. Special Fish and Meal .....	8.00	2.47	3.00
C. C. Co. Wheat Grower .....	8.00	....	4.00
C. C. Co. Dixie Guano .....	8.00	1.65	2.00
Hart's Special Tobacco Grower .....	8.00	2.47	3.00
Red Wing Standard Tobacco Guano .....	8.00	2.47	5.00
Pantego Potato Guano .....	7.00	4.12	7.00
Neuse Truck Grower .....	6.00	4.94	6.00
Japan Tobacco Guano .....	6.00	3.29	7.00
C. C. Co.'s Truck Guano 5-10-2.50 .....	5.00	8.24	2.50
C. C. Co.'s Top Dresser A. ....	4.00	8.24	4.00
C. C. Co. Top Dresser B .....	4.00	6.18	2.50
C. C. Co. Top Dresser C .....	....	7.41	3.00
Genuine German Kainit .....	....	....	12.00

*Conestee Chemical Co., Wilmington, N. C.—*

16% Acid Phosphate .....	16.00	....	....
Conestee High Grade Acid Phosphate .....	14.00	....	....
Conestee Bone and Potash .....	12.00	....	2.00
Conestee Bone and Potash .....	12.00	....	3.00
Conestee Bone and Potash .....	12.00	....	4.00
Conestee Bone and Potash .....	12.00	....	5.00
Conestee Bone and Potash .....	12.00	....	6.00
Conestee Bone and Potash .....	11.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Conestee Bone and Potash .....	11.00	....	3.00
Conestee Bone and Potash .....	11.00	....	4.00
Conestee Bone and Potash .....	11.00	....	5.00
Conestee Bone and Potash .....	11.00	....	6.00
Conestee Bone and Potash .....	10.00	....	2.00
Conestee Bone and Potash .....	10.00	....	3.00
Conestee Bone and Potash .....	10.00	....	4.00
Conestee Bone and Potash .....	10.00	....	5.00
Conestee Bone and Potash .....	10.00	....	6.00
Conestee Premo Guano .....	9.00	.82	3.00
Conestee Square Deal Fertilizer .....	9.25	1.65	2.00
Conestee Square Deal Fertilizer for Tobacco	9.25	1.65	2.00
Adams's Special Fertilizer .....	9.00	2.47	4.00
Conestee Cotton Grower .....	9.00	2.27	2.00
Conestee Melon Grower .....	8.00	4.12	7.00
Conestee Special Fertilizer for Cotton ....	8.00	4.12	7.00
Conestee Special Fertilizer for Tobacco ....	8.00	4.12	7.00
Conestee P. D. Q. Fertilizer .....	8.00	3.30	4.00
Conestee P. D. Q. Fertilizer for Tobacco...	8.00	3.30	4.00
Conestee O. K. Fertilizer .....	8.00	3.30	4.00
Conestee O. K. Fertilizer for Tobacco .....	8.00	3.30	4.00
Conestee King Bee Fertilizer .....	8.00	3.30	4.00
Conestee Gloria Fertilizer for Tobacco .....	8.00	2.47	7.00
Conestee Plumb Good Fertilizer .....	8.00	2.47	4.00
Conestee Crop Grower for Tobacco .....	8.00	2.47	4.00
Conestee Special Fertilizer .....	8.00	2.47	3.00
Conestee Special Tobacco Fertilizer .....	8.00	2.47	3.00
Conestee Fish Scrap Guano .....	8.00	2.47	3.00
Conestee Fish Scrap Guano for Tobacco ...	8.00	2.47	3.00
Conestee 8-3-3 C. S. M. Guano .....	8.00	2.47	3.00
Conestee 8-3-3 C. S. M. Guano for Tobacco...	8.00	2.47	3.00
Conestee Wizard Guano .....	8.00	2.47	3.00
Conestee Wizard Guano for Tobacco .....	8.00	2.47	3.00
Conestee Fertilizer .....	8.00	2.47	2.50
Conestee Fertilizer for Tobacco .....	8.00	2.47	2.50
Conestee Merito Mixture .....	8.00	2.06	4.00
Conestee Tobacco Grower .....	8.00	2.06	3.00
Conestee Crop Grower .....	8.00	2.06	3.00
Conestee Complete Fertilizer .....	8.00	2.06	2.00
Conestee Special Grain Fertilizer .....	8.00	1.65	2.00
Conestee Standard Guano .....	8.00	1.65	2.00
Conestee Standard Guano for Tobacco .....	8.00	1.65	2.00
Cotton Seed Meal Guano .....	8.00	1.65	2.00
Cotton Seed Meal Guano for Tobacco .....	8.00	1.65	2.00
Conestee Bone and Potash .....	8.00	....	4.00
Conestee Bone and Potash .....	8.00	....	5.00
Conestee Bone and Potash .....	8.00	....	6.00
Conestee Root Crop Guano .....	7.00	4.12	7.00
Conestee Standard Truck Guano .....	7.00	4.12	5.00
Conestee Cotton King Fertilizer .....	7.00	2.47	4.00
Conestee Vindex Fertilizer .....	7.00	3.30	5.00
Conestee High Grade Guano .....	6.00	4.95	8.00
Conestee Truck Grower .....	6.00	3.30	8.00
Conestee Corn Guano .....	6.00	2.47	3.00
Conestee Special Top Dresser .....	4.00	8.25	4.00
Dried Ground Fish .....	4.00	8.22	....
Fountain's Special Top Dresser .....	....	9.87	5.00
Conestee Top Dresser .....	....	7.40	3.00
Genuine German Kainit .....	....	....	12.00
High Grade German Kainit 16% .....	....	....	16.00
Sulphate of Potash .....	....	....	48.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Muriate of Potash .....	....	....	48.00
Sulphate of Ammonia .....	....	20.56	....
Nitrate of Soda .....	....	14.81	....
Dried Ground Blood .....	....	11.51	....
Cotton Seed Meal .....	....	6.17	....

*The Coe-Mortimer Co., Charleston, S. C.—*

Genuine Key Tree Brand Thomas Phosphate Total .....	18.00	....	....
Genuine Key Tree Brand Thomas Phosphate Total .....	18.00	....	....
Genuine Key Tree Brand Thomas Phosphate Total .....	17.50	....	....
Genuine Key Tree Brand Thomas Phosphate Total .....	17.50	....	....
Coe-Mortimer Co.'s Dissolved Bone .....	16.00	....	....
Coe-Mortimer Co.'s Dissolved Bone .....	14.00	....	....
Coe-Mortimer Co.'s Progressive Farmer ....	10.00	2.47	3.00
Coe-Mortimer Co.'s Bone and Potash .....	10.00	....	2.00
Coe-Mortimer Co.'s Bone and Potash .....	10.00	....	4.00
Carolina Special .....	9.00	2.47	3.00
Coe-Mortimer Co.'s Corn Club .....	9.25	2.06	2.00
Coe-Mortimer's M. H. G. ....	9.00	1.65	3.00
Knickerbocker Standard .....	9.20	1.65	2.00
Coe-Mortimer's Tar Heel .....	9.00	.82	3.00
Coe-Mortimer Co.'s Tobacco Special .....	8.00	2.47	3.00
Darlington Guano .....	8.00	2.47	3.00
Coe-Mortimer Co.'s Cotton and Corn .....	8.00	2.06	3.00
Coe-Mortimer Co.'s General Crop .....	8.00	2.06	2.00
Coe-Mortimer Co.'s Standard .....	8.00	2.06	1.00
Coe-Mortimer Co.'s Straight Goods .....	8.00	1.65	3.00
Coe-Mortimer Co.'s Special Formula .....	8.50	1.65	2.00
Universal .....	8.00	1.65	2.00
Coe-Mortimer Co.'s 8-4-3 .....	8.00	3.29	3.00
Morcoe Guano .....	8.00	3.29	4.00
Imported Fish Guano .....	5.80	8.23	....
Coe-Mortimer Co.'s Top Dresser .....	4.00	6.17	2.50
Nitrate of Soda .....	....	14.83	....
High Grade Dried Blood .....	....	13.37	....

*Contentnea Guano Co., Wilson, N. C.—*

H. G. 16% Acid .....	16.00	....	....
Contentnea 14% Acid .....	14.00	....	....
Bone and Potash Mixture, No. 3 .....	10.00	....	5.00
Bone and Potash Mixture, No. 2 .....	10.00	....	4.00
Bone and Potash Mixture, No. 1 .....	10.00	....	2.00
Contentnea Cotton Grower .....	9.00	2.47	2.00
Contentnea Cotton Formula .....	9.00	2.25	2.00
Plant Bed Tobacco Grower .....	8.00	2.47	3.00
Plant Bed Special .....	8.00	3.30	2.00
Blood and Bone Cotton Grower .....	8.00	1.65	2.00
Brag Corn Grower .....	8.00	.82	5.00
8-4½-7 for Tobacco .....	8.00	3.70	7.00
8-4½-7 for Cotton .....	8.00	3.70	7.00
Climax Cotton Grower .....	8.00	3.30	4.00
Climax Tobacco Grower .....	8.00	3.30	4.00
High Grade Tobacco Grower .....	8.00	2.90	5.00
Government Formula, No. 1 .....	8.00	2.47	10.00
High Grade Top Dresser .....	4.00	8.25	4.00
Nitrate of Soda .....	....	14.82	....
Muriate of Potash .....	....	....	50.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Sulphate of Potash .....	....	....	50.00
Manure Salts .....	....	....	20.00
High Grade 16% German Kainit .....	....	....	16.00
Standard German Kainit .....	....	....	12.00

*Contentnea Guano Co., Wilson, N. C.—*

Special Cotton Grower .....	9.00	3.05	2.50
Special Tobacco Grower .....	9.00	3.05	4.00
High Grade Tobacco Grower .....	8.00	3.30	4.00
Government Formula, No. 2 .....	8.00	2.47	7.00
Victor Tobacco Grower .....	8.00	2.47	5.00
Farmers Favorite Tobacco Grower .....	8.00	2.47	4.00
Plant Bed Tobacco Grower .....	8.00	2.47	3.00
Pick Leaf Tobacco Fertilizer .....	8.00	2.47	3.00
Top Notch Fertilizer .....	8.00	2.47	3.00
Matchless Cotton Grower .....	8.00	2.47	3.00
Brag Cotton Grower .....	8.00	2.05	3.00
Contentnea Top Dresser .....	3.00	8.25	5.00

*Carolina Warehouse, Inc., Greensboro, N. C.—*

Raw Bone Meal .....	22.00	3.70	....
Farmers' Coöperative Union Acid Phosphate .....	17.00	....	....
Thomas Phosphate .....	17.00	....	....
Farmers' Coöperative Union Acid Phosphate .....	16.00	....	....
Farmers' Coöperative Union Acid Phosphate .....	14.00	....	....
Farmers' Coöperative Union Acid Phosphate .....	13.00	....	....
Farmers' Coöperative Union Acid Phosphate .....	12.00	....	....
Farmers' Coöperative Union Bone and Potash .....	11.00	....	5.00
Farmers' Coöperative Union Bone and Potash .....	10.00	....	6.00
Farmers' Coöperative Union Bone and Potash .....	10.00	....	4.00
Farmers' Coöperative Union Bone and Potash .....	10.00	....	2.00
Farmers' Coöperative Union Guano.....	10.00	3.30	4.00
Farmers' Coöperative Union Guano.....	10.00	1.65	2.00
Farmers' Coöperative Union Guano.....	10.00	1.03	6.00
Farmers' Coöperative Union Guano.....	9.00	2.47	3.00
Farmers' Coöperative Union Tobacco Guano..	9.00	2.47	3.00
Farmers' Coöperative Union Guano.....	9.00	2.05	5.00
Farmers' Coöperative Union Guano.....	9.00	2.05	3.00
Farmers' Coöperative Union Guano.....	9.00	1.65	3.00
Farmers' Coöperative Union Guano.....	9.00	.82	3.00
Farmers' Coöperative Union Guano .....	8.00	.82	5.00
Farmers' Coöperative Union Guano .....	8.00	.82	3.00
Farmers' Coöperative Union Bone and Potash .....	8.00	....	5.00
Farmers' Coöperative Union Bone and Potash .....	8.00	....	4.00
Farmers' Coöperative Union Guano.....	8.00	4.11	7.00
Farmers' Coöperative Union Guano .....	8.00	3.30	4.00
Farmers' Coöperative Union Tobacco Guano..	8.00	3.30	4.00
Farmers' Coöperative Union Tobacco Guano..	8.00	2.47	5.00
Farmers' Coöperative Union Guano.....	8.00	2.47	5.00
Farmers' Coöperative Union Guano.....	8.00	2.47	3.00
Farmers' Coöperative Union Tobacco Guano..	8.00	2.47	3.00
Farmers' Coöperative Union Tobacco Guano..	8.00	2.05	3.00
Farmers' Coöperative Union Guano.....	8.00	2.05	3.00
Farmers' Coöperative Union Guano.....	8.00	1.65	5.00
Farmers' Coöperative Union Guano.....	8.00	1.65	4.00
Farmers' Coöperative Union Guano.....	8.00	1.65	3.00
Farmers' Coöperative Union Guano.....	8.00	1.65	2.00
Farmers' Coöperative Union Guano.....	8.00	.82	3.00
Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda .....	....	14.81	....
Dried Blood .....	....	13.16	....

*Coöperative Warehouse Co., Salisbury, N. C.—*

Farmers' Union Ground Phosphate Rock			
Total .....	28.00	....	....
Farmers' Union 21.5-4.5 Bone Meal....Total	21.50	3.70	....
Farmers' Union 20-12 Bone and Potash.....	20.00	....	12.00
Farmers' Union 20-8 Bone and Potash .....	20.00	....	8.00
Farmers' Union Thos. Phosphate .....	17.00	....	....
Farmers' Union 16% Acid Phosphate .....	16.00	....	....
Farmers' Union 14% Acid Phosphate .....	14.00	....	....
Farmers' Union 13% Acid Phosphate .....	13.00	....	....
Farmers' Union Dissolved Animal Bone .....	13.00	2.06	....
Farmers' Union 12-4-4 Guano .....	12.00	3.29	4.00
Farmers' Union 12-2-4 Guano .....	12.00	1.65	4.00
Farmers' Union 12% Acid Phosphate .....	12.00	....	....
Farmers' Union 12-6 Bone and Potash .....	12.00	....	6.00
Farmers' Union 12-5 Bone and Potash .....	12.00	....	5.00
Farmers' Union 12-4 Bone and Potash .....	12.00	....	4.00
Farmers' Union 12-3 Bone and Potash .....	12.00	....	3.00
Farmers' Union 12-2 Bone and Potash .....	12.00	....	2.00
Farmers' Union 11-5 Bone and Potash .....	11.00	....	5.00
Farmers' Union 10-4-4 Guano .....	10.00	3.29	4.00
Farmers' Union 10-3-3 Guano .....	10.00	2.47	3.00
Farmers' Union 10-2-2 Guano .....	10.00	1.65	2.00
Farmers' Union 10-1 $\frac{1}{4}$ -6 Guano .....	10.00	1.03	6.00
Farmers' Union 10-1 $\frac{1}{4}$ -4 Guano .....	10.00	1.03	4.00
Farmers' Union 10-6 Bone and Potash .....	10.00	....	6.00
Farmers' Union 10-5 Bone and Potash .....	10.00	....	5.00
Farmers' Union 10-4 Bone and Potash .....	10.00	....	4.00
Farmers' Union 10-3 Bone and Potash .....	10.00	....	3.00
Farmers' Union 10-2 Bone and Potash .....	10.00	....	2.00
Farmers' Union 9-3-6 Guano .....	9.00	2.47	6.00
Farmers' Union 9-3-4 Guano .....	9.00	2.47	4.00
Farmers' Union 9-3-3 Guano .....	9.00	2.47	3.00
Farmers' Union 9-2 $\frac{3}{4}$ -2 Guano .....	9.00	2.26	2.00
Farmers' Union 9-2 $\frac{1}{4}$ -4 Guano .....	9.00	1.85	4.00
Farmers' Union 9-2-3 Guano .....	9.00	1.65	3.00
Farmers' Union 9-1-3 Guano .....	9.00	.82	3.00
Farmers' Union 8-4 $\frac{1}{2}$ -7 Guano .....	8.00	3.71	7.00
Farmers' Union 8-4 $\frac{1}{2}$ -7 Tobacco Guano .....	8.00	3.71	7.00
Farmers' Union 8-4-6 Guano .....	8.00	3.29	6.00
Farmers' Union 8-4-6 Tobacco Guano .....	8.00	3.29	6.00
Farmers' Union 8-4-4 Guano .....	8.00	3.29	4.00
Farmers' Union 8-4-2 Guano .....	8.00	3.29	2.00
Farmers' Union 8-3-7 Guano .....	8.00	2.47	7.00
Farmers' Union 8-3-7 Tobacco Guano .....	8.00	2.47	7.00
Farmers' Union 8-3-6 Guano .....	8.00	2.47	6.00
Farmers' Union 8-3-6 Tobacco Guano .....	8.00	2.47	6.00
Farmers' Union 8-3-10 Guano .....	8.00	2.47	10.00
Farmers' Union 8-3-5 Guano .....	8.00	2.47	5.00
Farmers' Union 8-3-5 Tobacco Guano .....	8.00	2.47	5.00
Farmers' Union 8-3-3 Guano .....	8.00	2.47	3.00
Farmers' Union 8-3-3 Tobacco Guano .....	8.00	2.47	3.00
Farmers' Union 8-2 $\frac{1}{2}$ -3 Guano .....	8.00	2.06	3.00
Farmers' Union 8-2 $\frac{1}{2}$ -3 Tobacco Guano .....	8.00	2.06	3.00
Farmers' Union 8-2 $\frac{1}{2}$ -2 Guano .....	8.00	2.06	2.00
Farmers' Union 8-2 $\frac{1}{2}$ -2 Tobacco Guano .....	8.00	2.06	2.00
Farmers' Union 8-2-10 Guano .....	8.00	1.65	10.00
Farmers' Union 8-2-5 Guano .....	8.00	1.65	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Farmers' Union 8-2-5 Tobacco Guano .....	8.00	1.65	5.00
Farmers' Union 8-2-3 Guano .....	8.00	1.65	3.00
Farmers' Union 8-2-2 Guano .....	8.00	1.65	2.00
Farmers' Union 8-2-2 Tobacco Guano .....	8.00	1.65	2.00
Farmers' Union 8-1-4 Guano .....	8.00	.82	4.00
Farmers' Union 8-1-3 Guano .....	8.00	.82	3.00
Farmers' Union 8-5 Bone and Potash .....	8.00	....	5.00
Farmers' Union 8-4 Bone and Potash .....	8.00	....	4.00
Farmers' Union 7-7-7 Guano .....	7.00	5.76	7.00
Farmers' Union 7-5-8 Guano .....	7.00	4.12	8.00
Farmers' Union 7-5-5 Guano .....	7.00	4.12	5.00
Farmers' Union 7-4-5 Guano .....	7.00	3.29	5.00
Farmers' Union 6-6-6 Guano .....	6.00	4.94	6.00
Farmers' Union 6-4-7 Guano .....	6.00	3.29	7.00
Farmers' Union 4-7 $\frac{1}{2}$ -2 Top Dresser .....	4.00	6.17	2.00
Farmers' Union 4-4-6 Guano .....	4.00	3.29	6.00
Farmers' Union Tankage .....	2.00	8.24	....
Farmers' Union 0-9-3 Top Dresser .....	....	7.40	3.00
Farmers' Union 12% Kainit .....	....	....	12.00
Farmers' Union Nitrate of Soda .....	....	15.00	....
Farmers' Union Muriate of Potash .....	....	....	48.00
Farmers' Union Sulphate of Potash .....	....	....	48.00
Farmers' Union Fish Scrap .....	....	8.24	....
Farmers' Union Dried Blood .....	....	13.00	....
Farmers' Union Cotton Seed Meal .....	....	6.17	....

*Carolina Union Fertilizer Co., Norfolk, Va.—*

Carolina Union Raw Bone Meal .....	21.00	3.70	....
Carolina Union 16 .....	16.00	....	....
Carolina Union 14 .....	14.00	....	....
Carolina Union 14-2 .....	14.00	....	2.00
Carolina Union 12-2 .....	12.00	....	2.00
Carolina Union 3-10-3 .....	10.00	2.47	3.00
Carolina Union 4-10 .....	10.00	3.30	....
Carolina Union 10-2 .....	10.00	....	2.00
Carolina Union 10-4 .....	10.00	....	4.00
Carolina Union 10-3 .....	10.00	....	3.00
Carolina Union 2-9-3 .....	9.00	1.65	3.00
Carolina Union 1-9-3 .....	9.00	.82	3.00
Carolina Union 1-9-2 .....	9.00	.82	2.00
Carolina Union 3-9-3 .....	9.00	2.47	3.00
Carolina Union 3-9-4 .....	9.00	2.47	4.00
Carolina Union 1.21-9-2 .....	9.00	1.00	2.00
Carolina Union 2-8-2 .....	8.00	1.65	2.00
Carolina Union 4-8-4 .....	8.00	3.30	4.00
Carolina Union 3-8-3 .....	8.00	2.47	3.00
Carolina Union 2-8-2 .....	8.00	1.65	2.00
Carolina Union 3-8-3 .....	8.00	2.47	3.00
Carolina Union 3-8-1 .....	8.00	2.47	1.00
Carolina Union 2-8-3 .....	8.00	1.65	3.00
Carolina Union 3-8-4 .....	8.00	2.47	4.00
Carolina Union 2 $\frac{1}{2}$ -8-3 .....	8.00	2.06	3.00
Carolina Union 4-8-3 .....	8.00	3.30	3.00
Carolina Union 3-8-3 .....	8.00	2.47	3.00
Carolina Union 4-8-4 .....	8.00	3.30	4.00
Carolina Union 1-8-3 .....	8.00	.82	3.00
Carolina Union 2 $\frac{1}{4}$ -8-2 .....	8.00	2.05	2.00
Carolina Union 3-8-2 .....	8.00	2.47	2.00
Carolina Union 5-7-5 .....	7.00	4.12	5.00
Carolina Union 7-6-5 .....	6.00	5.76	5.00
Carolina Union 10-2-2 .....	2.00	8.22	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Carolina Union 10-2-2 .....	2.00	8.22	2.00
Cotton Seed Meal .....	....	6.16	....
Blood .....	....	13.16	....
Carolina Union Nitrate Soda .....	....	14.85	....

*Dey & Bros., Beaufort, N. C.—*

Ground Fish Scrap .....	7.00	8.25	....
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*Dixie Guano Co., Inc., Suffolk, Va.—*

Dixie Acid Phosphate .....	16.00	....	....
Dixie Good Luck Brand (revised) .....	12.50	1.00	3.00
Dixie Alkaline Bone and Potash .....	11.00	....	2.00
Dixie Monticello Brand .....	10.00	1.00	2.00
Dixie 8-4-4 Guano .....	8.00	3.29	4.00
Dixie Standard Guano .....	8.00	1.65	2.00
Dixie Bonus Brand .....	8.00	1.65	2.00
Dixie High Grade Guano .....	8.00	2.47	3.00
Dixie 5% Trucker Guano .....	7.00	4.11	5.00
Dixie 7% Potato Guano .....	6.00	5.75	5.00
Dixie 10% Top Dresser .....	5.00	8.23	3.00
Cotton Seed Meal .....	....	6.16	....
Nitrate of Soda .....	....	.15	....
Ground Fish .....	....	8.22	....

*Eastern Cotton Oil Co., Hertford, N. C.—*

Acid Phosphate .....	16.00	....	....
Acid Phosphate .....	14.00	....	....
10-1-4 for Peanuts .....	10.00	.83	4.00
Bone-Potash .....	10.00	....	4.00
Bone-Potash .....	10.00	....	2.00
Currituck Special for Yellow Sweets.....	8.00	3.29	6.00
Mat White Special .....	8.00	3.29	4.00
Farmers Sensation for Tobacco .....	8.00	2.47	3.00
It-Grows Currituck Yellows .....	8.00	2.47	3.00
Rain-Proof Cotton Grower .....	8.00	2.47	3.00
Fish and Blood Mixture .....	8.00	1.65	2.00
Perquimans Favorite .....	8.00	1.65	2.00
Early Bird .....	7.00	4.12	5.00
Hertford Truck Grower .....	6.00	5.77	5.00
Tankage and Fish Substitute, Peruvian.....	6.00	4.12	7.00
Nun-Such Potato Grower .....	6.00	4.12	7.00
Nitrate of Soda .....	....	15.67	....
Fish Scrap .....	....	9.00	....
Sulphate of Potash .....	....	....	48.00
Muriate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00
Choice Cotton Seed Meal .....	....	6.60	....
Cotton Seed Meal .....	....	6.08	....

*Etiwan Fertilizer Co., Charleston, S. C.—*

Etiwan 16% Acid Phosphate .....	16.00	....	....
Etiwan H. G. Acid Phosphate .....	14.00	....	....
Etiwan Dissolved Bone .....	13.00	....	....
Etiwan Soluble Bone .....	13.00	....	....
Etiwan Acid Phosphate with Potash .....	11.00	....	1.00
Plow Brand Acid Phosphate with Potash ....	11.00	....	1.00
Etiwan Potash Bone .....	10.00	....	4.00
Etiwan Soluble Bone with Potash .....	10.00	....	3.00
Diamond Soluble Bone with Potash .....	10.00	....	2.00
Acid Phosphate with Potash .....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Etiwan Blood and Bone Guano .....	9.00	2.06	1.00
Plow Brand Raw Bone Superphosphate .....	9.00	2.06	1.00
Plow Brand Ammoniated Dissolved Bone ....	9.00	1.65	2.00
Etiwan Complete Fertilizer .....	8.00	2.06	2.00
Etiwan 8-3-2 Tobacco Fertilizer .....	8.00	2.47	2.00
Etiwan Superior Cotton Fertilizer .....	8.00	3.30	6.00
Etiwan Special Cotton Fertilizer .....	8.00	3.30	4.00
Plow Brand Special Tobacco Fertilizer .....	8.00	3.30	4.00
Etiwan Cotton Compound .....	8.00	2.47	3.00
Etiwan High Grade Cotton Fertilizer .....	8.00	2.47	2.00
Etiwan Ammoniated Fertilizer .....	8.00	1.65	2.00
Plow Brand Ammoniated Fertilizer .....	8.00	1.65	2.00
Etiwan Special Potash Mixture .....	8.00	....	4.00
Nitrate of Soda .....	....	14.82	....
Muriate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00
<i>Federal Chemical Co., Columbia, Tenn.—</i>			
Tennessee Brown Phosphate Rock ....Total	29.75	....	....
<i>Foreign Products Co., Inc., Baltimore, Md.—</i>			
Thomas Phosphate or Basic Slag.....Total	17.00	....	....
Acid Phosphate .....	16.00	....	....
16% Acid Phosphate .....	16.00	....	....
Nitrate of Soda .....	....	15.00	....
<i>Farmers Guano Works, Dillard, Ga.—</i>			
Special for Wheat .....	12.00	.82	2.00
Small Grain Compound .....	10.00	....	2.00
<i>Franklin Cotton, Oil and Fertilizer Co., Franklin, Va.—</i>			
Pretlow and Co.'s Samson Guano .....	8.00	1.65	2.00
Pretlow and Co.'s C. S. Meal Mixture .....	8.00	2.47	3.00
<i>Farmers Guano Co., Norfolk, Va.—</i>			
Raw Bone Meal .....	20.00	3.70	....
16% Acid Phosphate .....	16.00	....	....
16% Acid Phosphate .....	16.00	....	....
14% Acid Phosphate .....	14.00	....	....
14% Acid Phosphate .....	14.00	....	....
Bone and Potash Mixture .....	14.00	....	2.00
Farmers Acid Phosphate .....	13.00	....	....
Farmers Acid Phosphate .....	13.00	....	....
Bone and Potash Mixture .....	12.00	....	2.00
Special H. G. Bone and Potash .....	11.00	....	5.00
Special H. G. Bone and Potash .....	11.00	....	5.00
Farmers Grain Grower .....	10.00	1.03	2.00
Special Bone and Potash .....	10.00	....	4.00
Century Bone and Potash .....	10.00	....	2.00
Farmers Grain Grower .....	10.00	1.03	2.00
Special Bone and Potash .....	10.00	....	4.00
Farmers 8-4-3 Special .....	8.00	3.29	3.00
Special Bone and Potash .....	8.00	....	4.00
Farmers Blood and Bone .....	8.00	3.29	4.00
Farmers Meal and Tankage Mixture .....	8.00	3.29	4.00
Big Crop Guano for Tobacco .....	8.00	2.88	5.00
Money Point Guano .....	8.00	2.47	3.00
Golden Grade Guano .....	8.00	2.47	3.00
Farmers Formula for Tobacco .....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Toco Tobacco Guano .....	8.00	2.06	3.00
Farmers 8-2-5 Guano .....	8.00	1.65	5.00
State Standard Guano .....	8.00	1.65	2.00
Farmers Ammoniated Guano .....	8.00	1.65	2.00
Farmers Peanut Guano .....	8.00	1.03	4.00
Farmers Blood and Bone .....	8.00	3.29	4.00
Farmers Meal and Tankage Mixture .....	8.00	3.29	4.00
Big Crop Guano for Tobacco .....	8.00	2.88	5.00
Money Point Guano .....	8.00	2.47	3.00
Farmers Formula for Tobacco .....	8.00	2.47	3.00
Golden Grade Guano .....	8.00	2.47	3.00
Toco Tobacco Guano .....	8.00	2.06	3.00
Farmers 8-2-5 Guano .....	8.00	1.65	5.00
State Standard Guano .....	8.00	1.65	2.00
Farmers Peanut Guano .....	8.00	1.03	4.00
Special Bone and Potash .....	8.00	....	4.00
Farmers 7-7-7 Trucker .....	7.00	5.76	7.00
Farmers 7-5-8 Special .....	7.00	4.12	8.00
Farmers Challenge .....	7.00	4.12	5.00
Farmers 7-7-7 Trucker .....	7.00	5.76	7.00
Farmers 7-5-8 Special .....	7.00	4.11	8.00
Farmers Challenge .....	7.00	4.11	5.00
Farmers 6-7-5 Trucker .....	6.00	5.76	5.00
Farmers 6-7-5 Trucker .....	6.00	5.76	5.00
Farmers Special Formula .....	6.00	5.76	3.00
Farmers Top Dresser .....	3.00	8.23	4.00
Farmers Top Dresser .....	3.00	8.23	4.00
Nitrate of Soda .....	....	15.63	....
Kanona Tankage .....	....	9.04	....
Genuine German Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00
Genuine German Kainit .....	....	....	12.00
Nitrate of Soda .....	....	15.65	....
Kanona Tankage .....	....	9.04	....
Ground Fish .....	....	8.22	....
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00

*Farmville Oil and Fertilizer Co., Farmville, N. C.—*

Ready Mixed Cotton Guano .....	10.00	2.67	1.00
Lewis Cotton Mixture .....	9.00	2.67	2.00
Marlboro Tobacco Grower .....	8.00	2.47	3.00
Golden Crown .....	8.00	2.47	3.00
Marlboro Cotton Grower .....	8.00	2.47	3.00
Chamblee and Sons Special .....	8.00	2.25	2.00
Perfect Tobacco Guano .....	8.00	2.05	3.00
Davis Cotton Grower .....	8.00	1.65	2.00
Carolina Standard .....	8.00	1.65	2.00
Farmville Standard .....	8.00	1.65	2.00
Lewis Special for Cotton .....	7.00	2.67	4.50
Evergreen Top Dresser .....	4.00	8.24	4.00
Second Application .....	4.00	4.92	6.00

*Farmers Coöperative Fertilizer Co., Inc., Blackstone, Va.—*

Acid Phosphate .....	16.00	....	....
High Grade Acid Phosphate .....	16.00	....	....
Acid Phosphate .....	14.00	....	....
Sampson .....	10.00	2.47	5.00
Pope's Peerless .....	10.00	1.64	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
F. C. F. Co.'s Bone and Potash Compound ..	10.00	....	4.00
F. C. F. Co.'s Bone and Potash Compound ..	10.00	....	2.00
Acid and Ammonia Mixture .....	10.00	3.30	....
Farmville High Grade (C. S. M.) .....	10.00	2.47	4.00
Davis Corn Grower .....	10.00	.82	5.00
Pitt Co. Corn Grower .....	10.00	.82	4.00
Evergreen Corn Grower .....	10.00	1.65	1.00
Greene Co. Special for Tobacco .....	9.00	2.67	5.00
Greene Co. Substitute for Tobacco .....	9.00	2.67	2.00
Scientific Cotton Grower .....	9.00	2.26	2.00
Specific Cotton Grower .....	9.00	2.26	2.00
Special Formula H. G. Tobacco Grower ....	9.00	2.67	2.00
Special Formula H. G. Cotton Grower .....	9.00	2.67	2.00
Lewis Special Formula for Cotton .....	9.00	3.50	....
Virginia "X" .....	8.00	3.29	4.00
Meherrin .....	8.00	2.47	3.00
Nottoway Special .....	8.00	2.47	2.00
Free State Official .....	8.00	2.06	3.00
Paul Jones .....	8.00	1.64	2.00
Davis Special Guano .....	8.00	3.70	7.00
Carolina Chief .....	8.00	3.30	4.00
Turnage's Fish Scrap Mixture .....	8.00	3.30	4.00
Harris Bright Leaf Tobacco Grower .....	8.00	3.30	4.00
Uncle Sam Tobacco Grower .....	8.00	8.30	3.00
Big Leaf Tobacco Grower .....	8.00	2.47	7.00
Lewis 8-3-5 Tobacco Special .....	8.00	2.47	5.00
Sterling for Tobacco .....	8.00	2.47	5.00
Obelisk .....	8.00	2.47	4.00
Harris Special Tobacco Grower .....	8.00	2.47	3.00
Turnage's Fish Scrap Mixture .....	8.00	2.47	3.00
Congo for Tobacco .....	8.00	2.47	3.00
Davis High Grade Tobacco Manure .....	8.00	2.47	3.00
Virginian .....	3.00	3.29	2.00
Nitrate of Soda .....	....	15.00	....
Sulphate of Potash .....	....	....	50.00
Muriate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00
Hard Salts .....	....	....	16.00

*Farmers Cotton Oil Co., Wilson, N. C.—*

16% Acid Phosphate .....	16.00	....	....
Bonum Acid Phosphate .....	14.00	....	....
Contentnea Acid Phosphate .....	13.00	....	....
Washington's Corn Mixture .....	10.00	1.65	5.00
Xtra Good Bone and Potash .....	10.00	....	2.00
Carolina Choice Guano .....	10.00	3.30	2.00
Crop King Guano .....	10.00	2.47	1.00
Whitley's Special Guano .....	9.00	3.30	4.00
B. B. Special .....	8.00	2.88	8.00
Dean's Special Guano .....	8.00	3.70	7.00
Regal Tobacco Guano .....	8.00	2.88	5.00
Newsome Tobacco Special .....	8.00	2.47	4.00
Graves' Cotton Grower Guano .....	8.00	2.47	3.00
Golden Gem Guano .....	8.00	2.47	3.00
Wilson High Grade Guano .....	8.00	2.27	2.00
Planters Friend Guano .....	8.00	2.06	3.00
Farmers Special Guano .....	8.00	1.65	2.00
Rodgers' Truck Grower .....	7.00	5.76	7.00
Wilson Top Dresser .....	2.00	9.05	4.00
Perfect Top Dresser .....	2.00	8.23	5.00
Muriate of Potash .....	....	....	50.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
German Kainit .....	....	....	12.00
Nitrate Special .....	....	10.66	4.00
Tomlinson's Nitrate Special .....	....	9.87	5.00
Sulphate of Ammonia .....	....	20.57	....
Nitrate of Soda .....	....	15.63	....
Sulphate of Potash .....	....	....	50.00

*Fremont Oil Mill Co., Fremont, N. C.—*

16% Acid Phosphate .....	16.00	....	....
Fomco Cotton Fertilizer .....	10.00	3.08	2.00
Carolina C. S. M. Compound .....	9.00	2.26	2.00
Fremont Oil Mill Co.'s Special Tobacco.....	8.00	2.47	5.00
8-3-5 Compound .....	8.00	2.47	5.00
Nahunta Special .....	8.00	2.47	3.00
Up-to-Date .....	8.00	1.65	2.00
8-3-3 Tobacco Fertilizer .....	8.00	2.47	3.00
Fremont Fertilizer .....	8.00	2.47	1.50
Nitrate of Soda .....	....	14.85	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Kainit .....	....	....	12.00
Fish Scrap .....	....	9.00	....
Cotton Seed Meal .....	....	7.50	....

*General Manufacturing Co., Norfolk, Va., and  
New Bern, N. C.—*

Acid Phosphate .....	16.00	....	....
Acid Phosphate .....	14.00	....	....
Potash and Soluble Bone .....	12.00	....	3.00
Potash and Soluble Bone .....	10.00	....	2.00
Manure Substitute .....	8.00	3.30	4.00
Organic Cotton Grower .....	8.00	2.47	3.00
Tobacco Special .....	8.00	2.47	3.00
Big Crop Grower .....	8.00	1.65	2.00

*German Kali Works, Inc., New York, N. Y.—*

Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	47.00
Kainit .....	....	....	12.00

*Georgia Chemical Works, Augusta, Ga.—*

Georgia Concentrated Acid Phosphate .....	24.00	....	....
High Grade Dissolved Bone Phosphate .....	16.00	....	....
Extra Dissolved Bone Phosphate .....	14.00	....	....
Dissolved Bone Phosphate .....	13.00	....	....
Georgia 12-6 Bone and Potash .....	12.00	....	6.00
12% Dissolved Bone Phosphate .....	12.00	....	....
Georgia 12-2 Bone and Potash .....	12.00	....	2.00
High Grade XX Acid Phosphate with Potash	10.00	....	4.00
Bone and Potash .....	10.00	....	2.00
Carolina Special Cotton Grower .....	9.00	2.47	4.00
Mascot Blood and Bone .....	9.00	2.47	3.00
Bumper Tobacco Grower .....	9.00	1.85	4.00
Good as Gold Guano .....	9.00	1.65	3.00
Gem Crop Grower .....	9.00	1.65	2.00
Ammoniated Grain Grower .....	9.00	.82	3.00
Georgia Belle Compound .....	9.00	.82	2.00
Early Trucker, No. 2 .....	8.00	4.12	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Cardinal High Grade .....	8.00	3.29	4.00
Intensive Formula .....	8.00	2.47	3.00
Golden Leaf Special Tobacco Compound .....	8.00	2.47	3.00
Three Oaks High Grade .....	8.00	2.47	2.00
Thunderbolt Tobacco Special .....	8.00	2.06	3.00
Georgia Formula .....	8.00	1.65	2.00
Meal Mixture .....	8.00	1.65	2.00
Georgia Special Wheat and Corn Grower....	8.00	.82	4.00
Georgia Golden Grain Grower .....	8.00	.82	3.00
Acid Phosphate with 4% Potash .....	8.00	....	4.00
Georgia Special Tobacco .....	8.00	1.65	2.00
Nitrate of Soda .....	....	14.82	....
Cotton Seed Meal .....	....	6.19	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Kainit .....	....	....	12.00

*N. G. Grandy & Co., Elizabeth City, N. C.—*

Grandy's H. G. 16% Acid Phosphate .....	16.00	....	....
Grandy's Cotton Grower .....	8.00	2.47	3.00
Grandy's H. G. Potato Guano .....	6.00	4.12	7.00
Grandy's 5-6-5 Potato Manure .....	6.00	4.12	5.00

*The Hubbard Fertilizer Co., Baltimore, Md.—*

Hubbard's 16% Phosphate .....	16.00	....	....
Hubbard's 14% Phosphate .....	14.00	....	....
Hubbard's Wheat and Rye .....	12.00	....	2.00
Hubbard's Corn and Wheat .....	12.00	....	1.00
Hubbard's 4-8-3 .....	8.00	3.28	3.00
Hubbard's Yellow Wrapper .....	8.00	2.46	3.00
Hubbard's Exchange Guano .....	8.00	1.64	2.00
Hubbard's New Process Top Dresser .....	....	7.51	3.59

*M. P. Hubbard & Co., Inc., Baltimore, Md.—*

Hubbard's Dissolved Phosphate .....	16.00	....	....
Hubbard's Soluble Phosphate .....	14.00	....	....
Hubbard's Havana Special .....	8.00	2.47	3.00
Hubbard's Celebrated Phosphate .....	8.00	1.65	2.00

*The Hampton Guano Co., Norfolk, Va.—*

Pure Ground Bone .....Total	20.00	3.70	....
Supreme Acid Phosphate .....	16.00	....	....
Hampton Acid Phosphate .....	14.00	....	....
Hampton Bone and Potash Mixture .....	11.00	....	2.00
Dauntless Potash Mixture .....	10.00	....	2.00
Hampton Crop Grower .....	10.00	....	4.00
Hampton Special Tobacco Fertilizer .....	9.00	2.47	3.00
Hampton 4-8-3 Guano .....	8.00	3.29	3.00
Hampton 1½-8-3 Special .....	8.00	1.03	3.00
Shirley Super Phosphate .....	8.00	1.65	2.00
Extra Tobacco Guano .....	8.00	1.65	2.00
Arlington Special .....	9.00	1.85	3.00
Alpha Crop Grower .....	8.50	2.06	2.50
P. P. P. Princess Prolific Producer .....	8.00	2.47	3.00
Hampton Tobacco Guano .....	8.00	2.47	3.00
Little's Special .....	8.00	3.29	3.00
Little's Favorite Crop Grower .....	8.00	3.29	4.00
Hampton High Grade Tobacco Grower .....	8.00	3.29	4.00
Reliance Truck Guano .....	7.00	4.11	5.00
Virginia Truck Grower .....	6.00	5.76	5.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Hampton 10% Truck Grower .....	5.00	8.23	3.00
Hampton Top Dresser .....	4.00	8.23	2.00
Special Top Dresser .....	....	7.41	3.00
Nitrate of Soda .....	....	15.00	....

*Home Fertilizer and Chemical Company,  
Baltimore, Md.—*

Eclipse Dissolved Phosphate .....	16.00	....	....
Home High Grade Acid Phosphate.....	14.00	....	....
Home Dissolved Animal Bone .....	12.00	1.65	....
Gilt Edge Crop Grower .....	10.00	1.65	4.00
Eclipse Blood, Beef, and Bone .....	10.00	1.23	3.00
Home Bone and Potash .....	10.00	....	5.00
Home Alkaline Bone .....	10.00	....	2.00
Home Ammoniated Bone .....	9.00	1.65	3.00
Home B. G. Ammoniated Compound .....	9.00	.82	5.00
Everybody's Fertilizer .....	9.00	.82	2.00
Home Standard Guano .....	8.00	3.30	4.00
Eclipse Dissolved Bone and Potash .....	8.00	2.48	4.00
Riosa Tobacco Compound .....	8.00	2.48	3.00
Special C. & C. Compound .....	8.00	2.48	3.00
Yancey's Formula for Yellow Leaf Tobacco..	8.00	2.48	2.00
Phoenix Crop Grower .....	8.00	2.48	2.00
Matchless Guano .....	8.00	1.65	4.00
Home Cereal Fertilizer .....	8.00	1.65	2.00
Ammoniated Bone Manure .....	7.00	1.65	5.00
Farmers' Choice .....	7.00	.82	4.00
Home Potato Grower .....	6.00	3.30	4.00
Truckers' Special Compound .....	6.00	5.77	5.00
Cerealite Top Dressing .....	....	7.43	3.00
Home Fertilizer .....	....	5.77	7.00
Sulphate Ammonia .....	....	20.62	....
Nitrate of Soda .....	....	14.85	....

*Manufactured for S. B. Harrell & Co., Inc., Nor-  
folk, Va., by the Pocomoke Guano Company,  
Norfolk, Va.—*

Harrell's Acid Phosphate .....	14.00	....	....
Harrell's Eclipse .....	9.00	2.26	2.00
Harrell's Champion Cotton and Peanut Grower .....	8.00	1.65	2.00
Harrell's Truck Guano .....	6.00	5.76	5.00

*Hadley-Harriss Co., Inc., Wilson, N. C.—*

Hadley's Boss Guano .....	8.00	2.26	2.50
Daisy Fish Mixture .....	8.00	1.65	2.00
Golden Weed Tobacco Grower .....	8.00	2.47	3.00
Boss .....	8.00	2.25	2.50
Daisy Fish Mixture .....	8.00	1.64	2.00
Golden Weed Tobacco Grower .....	8.00	2.46	3.00
Electric Top Dresser .....	....	8.23	3.00
Nitrolite Top Dresser .....	....	9.86	2.00

*The Imperial Company, Norfolk, Va.—*

Imperial High Grade Tenn. Acid Phosphate.	16.00	....	....
Imperial High Grade Acid Phosphate .....	14.00	....	....
Imperial Catawba Wheat Grower .....	10.00	....	4.00
Imperial Virginia Grain Mixture .....	10.00	....	2.00
Imperial Bone and Potash .....	10.00	....	2.00
Imperial 2-9-3 Special .....	9.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Imperial Special Manure for Tobacco .....	9.00	2.47	3.00
Imperial Special Cotton Manure .....	9.00	2.47	3.00
Imperial Martin County Special Crop Grower .....	9.00	2.26	2.00
Imperial Robeson County Special .....	8.00	2.47	4.00
Imperial Tobacco Grower .....	8.00	3.29	4.00
Imperial Cotton Grower .....	8.00	1.65	2.00
Imperial Peanut and Corn Guano .....	8.00	1.65	2.00
Imperial Champion Guano .....	8.00	1.65	2.00
Imperial Cisco Soluble Guano .....	8.00	1.65	2.00
Imperial Standard Premium Guano .....	8.00	1.65	2.00
Imperial 1½-8-3 Special .....	8.00	1.03	3.00
Imperial Peanut Special .....	8.00	1.65	3.00
Imperial Bright Tobacco Guano .....	8.00	2.06	3.00
Imperial F. and B. Cotton Guano .....	8.00	2.06	3.00
Imperial Yellow Bark Sweet Potato Guano..	8.00	2.47	3.00
Imperial Tobacco Guano .....	8.00	2.47	3.00
Imperial XLQ Cotton Guano .....	8.00	2.47	3.00
Imperial Pee Dee Cotton Grower .....	8.00	2.47	3.00
Imperial Snowflake Special .....	8.00	3.29	3.00
Imperial 5-7-3 Trucker .....	7.00	4.11	3.00
Imperial 4-6-3 Special .....	6.00	3.29	3.00
Imperial Fish and Bone .....	6.00	3.29	4.00
Imperial Williams Special Potato Guano.....	6.00	4.11	5.00
Imperial 7-6-3 Trucker .....	6.00	5.76	3.00
Imperial Special 7%, for Potatoes .....	5.00	5.76	5.00
Imperial Ammonia Top Dresser for Spinach.	5.00	8.23	....
Imperial 10% Guano .....	5.00	8.23	2.50
Imperial Top Dresser for Cotton .....	4.00	8.23	2.00
Imperial Cotton-seed Meal .....	....	6.17	....
Imperial Top Dresser .....	....	7.40	3.00
Imperial Nitrate of Soda .....	....	15.00	....

*International Agricultural Corporation.*

*Atlanta, Ga.—*

High Grade Acid Phosphate .....	16.00	....	....
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*N. B. Josey Guano Company, Tarboro, N. C.—*

Josey's 16% Acid Phosphate .....	16.00	....	....
Josey's Bone and Potash Mixture .....	12.00	....	2.00
Josey's Bone and Potash Mixture.....	10.00	....	2.00
Josey's Bone and Potash .....	10.00	....	4.00
Josey's 8-4-2 C. S. Meal and Fish Scrap Guano .....	8.00	3.30	2.00
Josey's 8-3-2 C. S. Meal and Fish Scrap Guano .....	8.00	2.47	2.00
Josey's 8-3-1 C. S. Meal and Fish Scrap Guano .....	8.00	2.47	1.00
Josey's 8-4-1 C. S. Meal and Fish Scrap Guano .....	8.00	3.30	1.00
Josey's Truck Guano .....	8.00	4.10	5.00
Josey's Big Yield Guano .....	8.00	3.30	4.00
Josey's 8-4-4 C. S. Meal and Fish Scrap Guano .....	8.00	3.30	4.00
Josey's Special Tobacco Guano .....	8.00	2.47	5.00
Josey's Tip Top C. S. Meal and Fish Scrap Guano .....	8.00	2.47	3.00
Josey's Bright Leaf Tobacco Guano.....	8.00	2.47	3.00
Josey's "U-NO" Guano .....	8.00	2.47	3.00
Josey's Quick Step Tobacco Guano .....	8.00	2.06	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Josey's Favorite C. S. Meal and Fish Scrap			
Guano .....	8.90	2.05	2.50
Josey's Cotton-seed Meal Guano .....	8.00	1.65	2.00
Josey's Potato Guano .....	7.00	5.77	7.00
Josey's "Big Four" C. S. Meal and Fish			
Scrap Guano .....	6.00	3.30	4.00
Josey's Peanut Guano .....	5.50	1.23	5.50
Josey's Elite Top Dresser .....	3.00	7.42	4.00
Josey's Special Formula Top Dresser.....	.....	8.25	4.00
Tip Top 10-4 Top Dresser .....	.....	8.10	4.00
Nitrate of Soda .....	.....	15.50	.....
Josey's Top Dresser .....	.....	7.42	4.00
Cotton-seed Meal .....	.....	6.19	.....
Muriate of Potash .....	.....	.....	48.00
Manure Salts .....	.....	.....	20.00
Genuine German Kainit .....	.....	.....	12.00
<i>A. S. Lee &amp; Sons Company, Inc., Richmond, Va.—</i>			
Acid Phosphate .....	16.00	.....	.....
Lee's 10-4 Mixture .....	10.00	.....	4.00
Lee's 10-2 Mixture .....	10.00	.....	2.00
Lee's Corn Fertilizer .....	10.00	.....	2.00
Lee's Wheat Fertilizer .....	10.00	.....	2.00
Lee's Bone and Potash .....	9.00	.....	4.00
Lee's 8-4-4 Mixture .....	8.00	3.29	4.00
Lee's 8-3-3 Mixture .....	8.00	2.47	3.00
Nitrate of Soda .....	.....	15.25	.....
Lee's Prepared Agricultural Lime .....	.....	.....	2.25
<i>Marlborough Fertilizer Co., Bennettsville, S. C.—</i>			
Marlboro High Grade .....	8.00	2.47	3.00
Marlboro Farmer .....	8.00	1.64	2.00
<i>McNair Phosphate Co., Laurinburg, N. C.—</i>			
Acid Phosphate .....	18.00	.....	.....
Acid Phosphate .....	16.00	.....	.....
Acid Phosphate .....	14.00	.....	.....
1035 .....	10.00	2.47	5.00
931 .....	9.00	2.47	1.00
942 .....	9.00	3.29	2.00
921 .....	9.00	1.65	1.00
932 .....	9.00	2.47	2.00
832 .....	8.00	2.47	2.00
842 .....	8.00	3.29	2.00
841 .....	8.00	3.29	1.00
822 .....	8.00	1.65	2.00
831 .....	8.00	2.47	1.00
E. L. M. ....	8.50	3.29	2.50
Muriate Potash .....	.....	.....	48.00
German Kainit .....	.....	.....	12.00
<i>E. H. &amp; J. A. Meadows, New Bern, N. C.</i>			
Meadows' Cabbage Guano .....	7.00	5.76	5.00
Meadows' Potato Guano .....	7.00	4.11	5.00
Meadows' Cabbage Guano .....	7.00	7.00	5.00
Meadows' Potato Guano .....	7.00	5.00	5.00
<i>McCabe Fertilizer Company, Charleston, S. C.—</i>			
Ground Phosphate Rock .....	20.00	.....	.....
McCabe's Perfection .....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>The Miller Fertilizer Company, Baltimore, Md.—</i>			
Miller's 16% Acid Phosphate .....	16.00	....	....
Acid Phosphate .....	14.00	....	....
Miller's 14% Acid Phosphate .....	14.00	....	....
Miller Fertilizer Co.'s 10-4.....	10.00	....	4.00
Clinch .....	10.00	....	2.00
Miller's Wheat Special .....	9.00	.82	3.00
Tobacco King .....	8.00	2.47	3.00
Ammoniated Dissolved Bone .....	8.00	1.65	2.00
Miller's Irish Potato .....	8.00	3.29	4.00
Standard .....	8.00	2.47	3.00
Farmers Profit .....	8.00	1.65	2.00
4% Tobacco .....	8.00	3.29	4.00
High Grade (Miller's) .....	8.00	2.06	3.00
No. 1 Potato and Vegetable Grower .....	8.00	3.71	7.00
Potato and Vegetable Grower .....	8.00	1.65	4.00
Quick-Step .....	8.00	2.47	4.00
Special Tobacco (Miller's) .....	8.00	4.11	7.00
Tobacco Compound .....	8.00	2.47	5.00
High Grade Potato .....	6.00	4.12	7.00
Nitrate of Soda .....	....	14.83	....

*Marietta Fertilizer Company, Greensboro.  
Chicago, Wilmington—*

Bone Meal .....	Total	24.00	2.47	....
Raw Bone Meal .....	Total	22.00	3.70	....
Extra High Grade Acid .....		17.00	....	....
Thomas Phosphate .....		17.00	....	....
High Grade Acid Phosphate .....		16.00	....	....
Marietta Fertilizer Co.'s 15-2 .....		15.00	....	2.00
Marietta Fertilizer Co.'s 15-2 .....		15.00	....	2.00
High Grade Acid Phosphate .....		14.00	....	....
Marietta 13-4 .....		13.00	....	4.00
Acid Phosphate .....		13.00	....	....
Marietta Potash Acid .....		12.00	....	6.00
Marietta Phosphate and Potash .....		12.00	....	4.00
Phosphate and Potash .....		12.00	....	2.00
Phosphate and Potash .....		12.00	....	2.00
Phosphate and Potash .....		11.00	....	1.00
Marietta Truck Guano .....		10.00	3.30	4.00
Marietta Ammoniated Bone .....		10.00	2.47	3.00
Marietta Special Formula .....		10.00	1.65	3.00
Royal Seal Guano .....		10.00	1.65	2.00
Special Mixture .....		10.00	1.05	6.00
Marietta Special Guano .....		10.00	.82	3.00
Langford's Special .....		10.00	1.65	4.00
Bone and Potash .....		10.00	....	6.00
Potash Mixture .....		10.00	....	5.00
Potash Special .....		10.00	....	4.00
Dissolved Bone and Potash .....		10.00	....	2.00
Marietta Special Formula .....		10.00	1.65	3.00
Fertilizer No. 1011 .....		10.00	.82	1.00
Phosphate and Potash .....		10.00	....	3.00
Marietta Blood and Bone .....		9.00	2.47	3.00
Fertilizer No. 92 <sup>1</sup> / <sub>5</sub> .....		9.00	2.05	5.00
Fertilizer No. 92 <sup>1</sup> / <sub>3</sub> .....		9.00	2.05	3.00
Marietta Blood and Bone Potash Special ....		9.00	1.65	3.00
Marietta Blood and Bone Special .....		9.00	.82	3.00
Marietta Beef, Blood and Bone .....		9.00	.82	2.00
R. Phosphate and Potash .....		9.00	....	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Fertilizer No. 921 <sup>1</sup> / <sub>4</sub> .....	9.00	1.85	4.00
Blood, Bone and Potash .....	8.00	4.11	7.00
Fertilizer No. 853 .....	8.00	4.11	3.00
Fertilizer No. 845 .....	8.00	3.30	5.00
Fertilizer No. 844 .....	8.00	3.30	4.00
Marietta Tobacco Fertilizer .....	8.00	3.30	4.00
Fertilizer No. 836 .....	8.00	2.47	6.00
Fertilizer No. 855 .....	8.00	4.11	5.00
Fertilizer No. 835 .....	8.00	2.47	5.00
Fertilizer No. 833 .....	8.00	2.47	3.00
Pride of Piedmont .....	8.00	2.47	3.00
Pride of Piedmont for Tobacco.....	8.00	2.47	3.00
Best for Tobacco .....	8.00	2.05	3.00
Farmer's Choice .....	8.00	2.05	3.00
Farmer's Choice for Tobacco .....	8.00	2.05	3.00
Fertilizer No. 825 .....	8.00	1.65	5.00
Fertilizer No. 823 .....	8.00	1.65	3.00
Solid South .....	8.00	1.65	2.00
Solid South Tobacco Guano .....	8.00	1.65	2.00
Fertilizer No. 813 .....	8.00	.82	3.00
Golden Grain Grower .....	8.00	....	4.00
Fertilizer No. 813 .....	8.00	.82	3.00
Marietta Fertilizer No. 837 .....	8.00	2.47	7.00
Fertilizer No. 758 .....	7.00	4.11	8.00
Fertilizer No. 755 .....	7.00	4.11	5.00
Fertilizer No. 672 .....	6.00	5.76	2.00
7% Trucker .....	6.00	5.76	5.00
5% Trucker .....	6.00	4.11	7.00
Fertilizer No. 637 .....	6.00	2.47	7.00
Marietta Top Dresser .....	4.00	6.18	2.50
Fertilizer No. 445 .....	4.00	3.30	5.00
Marietta Top Dresser .....	3.00	8.20	5.00
Marietta Top Dresser .....	....	7.81	4.00
Marietta Top Dresser .....	....	7.40	3.00
Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00
Nitrate of Soda .....	....	14.81	....
Dried Blood .....	....	13.16	....
10% Tankage .....	....	8.23	....
Cotton-seed Meal .....	....	6.18	....
Sulphate of Ammonia .....	....	20.00	....

*The MacMurphy Company, Charleston, S. C.—*

High Grade Acid Phosphate .....	16.00	....	....
High Grade Acid Phosphate .....	14.00	....	....
Acid Phosphate .....	13.00	....	....
Acid Phosphate and Potash .....	12.00	....	1.00
Acid Phosphate and Potash .....	11.00	....	1.00
Acid Phosphate and Potash ..	10.00	....	5.00
Acid Phosphate and Potash .....	10.00	....	4.00
Acid Phosphate and Potash .....	10.00	....	2.00
Wilcox Gills & Co.'s Manipulated Guano ....	9.25	2.26	2.00
Special 9.25-2-2 Cotton and Corn Guano .....	9.25	1.65	2.00
Special 8-4-6 .....	8.00	3.29	6.00
Special 8-4-4 Cotton Guano .....	8.00	3.29	4.00
Special 8-3-3 Cotton and Corn Guano .....	8.00	2.47	3.00
Special 8-2-2 Cotton Guano .....	8.00	1.65	2.00
Nitrate of Soda .....	....	14.81	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>John F. McNair, Laurinburg, N. C.—</i>			
Muriate Potash .....	.....	.....	48.00
Nitrate of Soda .....	.....	15.58	....
<i>Martin Fertilizer Co., Baltimore, Md., New Bern, N. C.—</i>			
Acid Phosphate .....	16.00	....	....
Potash and Soluble Bone .....	10.00	....	2.00
Tobacco Compound .....	9.00	2.26	2.00
Martin's 9-2-3 .....	9.00	1.65	3.00
Red Star Brand .....	8.00	3.28	4.00
Blood and Bone Fertilizer .....	8.00	3.28	4.00
Bull Head Fertilizer .....	8.00	2.46	3.00
Tobacco Special .....	8.00	2.46	3.00
Martin's Blue Ribbon Fertilizer .....	8.00	3.28	2.00
Martin's Special Guano .....	8.00	3.28	3.00
Martin's Peanut Grower .....	8.00	1.21	3.00
Carolina Cotton .....	8.00	1.65	2.00
Martin's 7% Guano .....	6.00	5.74	5.00
Farmers Favorite .....	6.00	4.10	5.00
Knowles Special .....	5.00	3.28	5.00
Martin's Nitrate of Soda .....	....	15.23	....
<i>Navassa Guano Company, Wilmington, N. C.—</i>			
Navassa 17% Acid Phosphate .....	17.00	....	....
Thomas Phosphate .....	17.00	....	....
Navassa 16% Acid Phosphate .....	16.00	....	....
Navassa Acid Phosphate .....	14.00	....	....
Navassa Dissolved Bone .....	13.00	....	....
Navassa Acid Phosphate .....	12.00	....	....
Navassa Wheat Belt Special .....	12.00	....	6.00
Navassa Special Grain Mixture .....	12.00	....	5.69
Navassa Special Wheat Mixture .....	12.00	....	4.00
Navassa Gray Land Mixture .....	12.00	....	4.00
Johnston County Bone and Potash .....	10.00	....	5.93
Navassa Wheat and Grass Grower .....	10.00	....	4.00
Navassa Dissolved Bone with Potash .....	10.00	....	4.99
Navassa Wheat Mixture .....	10.00	....	2.25
Navassa Dissolved Bone with Potash .....	10.00	....	2.00
Navassa Piedmont Wheat Grower .....	10.00	....	2.00
Navassa Dissolved Bone with Potash .....	10.00	....	6.00
Maxim Guano .....	10.00	2.47	2.00
Corona Guano .....	10.00	1.65	2.00
Navassa Fish Guano .....	9.00	2.47	3.00
Robeson County Special .....	9.00	2.47	3.00
John's Fish Guano .....	8.00	2.47	4.00
Navassa Manipulated Guano .....	9.00	2.26	2.00
Navassa Big Boll Special .....	9.00	2.26	2.00
Osceola Guano .....	9.00	1.65	3.00
Cape Fear Meal Mixture .....	9.00	1.65	3.00
Harvest Queen Fertilizer .....	9.00	1.65	2.00
Navassa Complete Fertilizer .....	9.00	1.65	1.00
Long's Wheat and Grain Guano .....	9.00	.82	3.00
Navassa Dissolved Bone with Potash .....	8.00	....	4.00
Farmer's Mixture .....	8.75	1.85	4.00
Navassa Universal Fertilizer .....	8.50	2.06	1.00
Enterprise Strawberry Grower .....	8.00	3.29	11.00
Navassa Special Meal Fertilizer .....	8.00	3.29	4.00
Coree Tobacco Guano .....	8.00	3.29	4.00
Navassa High Grade Fertilizer .....	8.00	3.29	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Navassa Special Truck Guano .....	8.00	3.29	4.00
Navassa Carib Guano .....	8.00	2.47	10.00
Navassa Complete Tobacco Mixture .....	8.00	2.47	10.00
Navassa Standard Tobacco Guano .....	8.00	2.47	7.00
Navassa Blood and Meal Mixture .....	8.00	2.47	5.00
Maultby's Tobacco Guano .....	8.00	2.47	5.00
Navassa Big Cotton Grower .....	8.00	2.47	4.00
Orton Guano .....	8.00	2.47	4.00
Navassa High Grade Guano .....	8.00	2.47	3.00
Clarendon Tobacco Grower .....	8.00	2.47	3.00
Navassa Standard Meal Guano .....	8.00	2.47	3.00
Navassa Carolina Tobacco Grower .....	8.00	2.47	3.00
Navassa C. S. M. Special 3% Guano .....	8.00	2.47	2.00
Navassa Strawberry Top Dressing .....	8.00	2.06	4.00
Sullivan's Tobacco Special .....	8.00	2.06	3.00
Mogul Guano .....	8.00	2.06	3.00
Maultsby's Meal Mixture .....	8.00	2.06	3.00
Navassa Guano for Tobacco .....	8.00	2.06	2.00
Ammoniated Soluble Navassa Guano .....	8.00	2.06	2.00
Brooks' Ammoniated Guano .....	8.00	2.06	1.50
Navassa Fruit Growers Fertilizer .....	8.00	1.65	6.00
Harvest King Guano .....	8.00	1.65	3.00
Clark's Special C. S. M. Guano .....	8.00	1.65	3.00
Navassa Grain Fertilizer .....	8.00	1.65	2.00
Navassa Cotton Fertilizer .....	8.00	1.65	2.00
Navassa C. S. M. Guano .....	8.00	1.65	2.00
Oconechee Tobacco Guano .....	8.00	1.65	2.00
Navassa Lettuce Grower Fertilizer .....	7.00	5.76	7.00
Maultsby's Tobacco Special .....	7.00	4.12	10.00
Navassa Root Crop Fertilizer .....	7.00	4.12	7.00
Navassa Premium Meal Guano .....	7.00	3.29	5.00
Navassa Creole Guano .....	6.00	4.12	7.00
Navassa Special for Tobacco .....	6.00	3.29	7.00
Navassa High Grade Top Dresser .....	4.00	7.82	4.00
Navassa Top Dresser .....	4.00	6.17	2.50
Navassa Quick Results Top Dresser .....	4.00	4.94	2.50
Navassa Crown Guano .....	4.00	3.29	4.00
Navassa Special Top Dresser .....	2.00	5.76	2.50
Navassa Big Lick Top Dresser .....	....	7.41	3.00
Pure Raw Bone .....	....	3.71	4.50
Sulphate of Ammonia .....	....	20.59	....
Nitrate of Soda .....	....	14.82	....
Blood .....	....	13.15	....
Fish Scrap .....	....	8.24	....
High Grade Tankage .....	....	8.25	....
Cotton-seed Meal .....	....	6.15	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00

*North Carolina Farmers Union,  
Statesville, N. C.—*

N. C. Farmers Union Concentrated Acid Phosphate .....	24.00	....	....
N. C. Farmers Union 20-12 Bone and Potash .....	20.00	....	12.00
N. C. Farmers Union Pure Bone Meal .....	20.60	3.71	....
N. C. Farmers Union Basic Slag .....	17.00	....	....
N. C. Farmers Union 16% Acid Phosphate..	16.00	....	....
N. C. Farmers Union 14% Acid Phosphate..	14.00	....	....
N. C. Farmers Union 12-2-1 Guano .....	12.00	1.65	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
N. C. Farmers Union 12-6 Bone and Potash.	12.00	....	6.00
N. C. Farmers Union 12-5 Bone and Potash.	12.00	....	5.00
N. C. Farmers Union 12-4 Bone and Potash.	12.00	....	4.00
N. C. Farmers Union 12-3 Bone and Potash.	12.00	....	3.00
N. C. Farmers Union 10-6 Bone and Potash.	10.00	....	6.00
N. C. Farmers Union 10-5 Bone and Potash.	10.00	....	5.00
N. C. Farmers Union 10-4 Bone and Potash.	10.00	....	4.00
N. C. Farmers Union 10-2 Bone and Potash.	10.00	....	2.00
N. C. Farmers Union 10-1 $\frac{1}{4}$ -6 Guano .....	10.00	1.03	6.00
N. C. Farmers Union 10-4-4 Guano .....	10.00	3.29	4.00
N. C. Farmers Union 10-3-3 Guano .....	10.00	2.47	3.00
N. C. Farmers Union 10-2-2 Guano .....	10.00	1.65	2.00
N. C. Farmers Union 9-2 $\frac{1}{4}$ -4 Guano .....	9.00	1.85	4.00
N. C. Farmers Union 9-2-3 Guano .....	9.00	1.65	3.00
N. C. Farmers Union 9-3-3 Guano .....	9.00	2.47	3.00
N. C. Farmers Union 9-1-3 Guano .....	9.00	.82	3.00
N. C. Farmers Union 9-3-6 Tobacco Guano ..	9.00	2.47	6.00
N. C. Farmers Union 9-1-2 Guano .....	9.00	.82	2.00
N. C. Farmers Union 8-1-4 Guano .....	8.00	.82	4.00
N. C. Farmers Union 8-1-3 Guano .....	8.00	.82	3.00
N. C. Farmers Union 8-2-3 Guano .....	8.00	1.65	3.00
N. C. Farmers Union 8-5 Bone and Potash.	8.00	....	5.00
N. C. Farmers Union 8-4 Bone and Potash.	8.00	....	4.00
N. C. Farmers Union 8-3-3 Guano .....	8.00	2.47	3.00
N. C. Farmers Union 8-3-3 Tobacco Guano ..	8.00	2.47	3.00
N. C. Farmers Union 8-2-2 Guano .....	8.00	1.65	2.00
N. C. Farmers Union 8-2-2 Tobacco Guano ..	8.00	1.65	2.00
N. C. Farmers Union .....	8.00	2.27	4.00
N. C. Farmers Union 8-2 $\frac{1}{2}$ -2 Guano .....	8.00	2.06	2.00
N. C. Farmers Union 8-2 $\frac{1}{2}$ -2 Tobacco Guano	8.00	2.06	2.00
N. C. Farmers Union 8-2 $\frac{1}{2}$ -3 Guano .....	8.00	2.06	3.00
N. C. Farmers Union 8-2 $\frac{1}{2}$ -3 Tobacco Guano	8.00	2.06	3.00
N. C. Farmers Union 8-4-4 Guano .....	8.00	3.29	4.00
N. C. Farmers Union 8-4-6 Guano .....	8.00	3.29	6.00
N. C. Farmers Union 8-4-6 Tobacco Guano..	8.00	3.29	6.00
N. C. Farmers Union 8-3-5 Guano .....	8.00	2.47	5.00
N. C. Farmers Union 8-3-5 Tobacco Guano..	8.00	2.47	5.00
N. C. Farmers Union 8-2-10 Guano .....	8.00	1.65	10.00
N. C. Farmers Union 8-2 $\frac{3}{4}$ -7 Tobacco Guano	8.00	2.26	7.00
N. C. Farmers Union 7-5-8 Guano .....	7.00	4.12	8.00
N. C. Farmers Union 7-4-5 Guano .....	7.00	3.29	5.00
N. C. Farmers Union 4-7 $\frac{1}{2}$ -2 Top Dresser ..	4.00	6.18	2.00
N. C. Farmers Union 0-9-3 Top Dresser ....	....	7.42	3.00
N. C. Farmers Union 12% Kainit .....	....	....	12.00
N. C. Farmers Union Nitrate of Soda ....	....	14.82	....
N. C. Farmers Union Muriate of Potash ...	....	....	48.00
N. C. Farmers Union Sulphate of Potash ..	....	....	48.00
N. C. Farmers Union Fish Scrap .....	....	8.20	....
N. C. Farmers Union Cotton-seed Meal ....	....	6.18	....
N. C. Farmers Union Agrl. Ground Lime- stone .....	....	....	....

*Norfolk Fertilizing Company, Norfolk, Va.—*

Oriana 16% Acid Phosphate.....	16.00	....	....
Whitney's High Grade Acid Phosphate .....	16.00	....	....
Oriana 14% Acid Phosphate.....	14.00	....	....
Oriana Bone and Potash .....	10.00	....	2.00
Young's Grain Grower .....	10.00	....	2.00
Oriana Wheat Grower .....	10.00	....	4.00
Oriana C. S. M. Special .....	9.00	2.26	2.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Oriana Special Manure for Tobacco .....	9.00	2.47	3.00
Oriana Special Cotton Fertilizer .....	9.00	2.47	3.00
Oriana 1¼-8-3 Special .....	8.00	1.03	3.00
Oriana Crop Grower .....	8.00	1.65	2.00
Oriana Cotton Guano .....	8.00	1.65	2.00
Oriana Bright Leaf Guano .....	8.00	2.06	3.00
Oriana for Cotton .....	8.00	2.47	3.00
Oriana Tobacco Guano .....	8.00	2.47	3.00
Oriana 4-8-3 Special .....	8.00	3.29	3.00
Oriana Complete Fertilizer .....	8.00	3.29	4.00
Oriana 5-7-3 Trucker .....	7.00	4.11	3.00
Oriana Special Mixture .....	6.00	4.11	5.00
Oriana 7-6-3 Trucker .....	6.00	5.76	3.00
Oriana Truck Guano .....	5.00	5.76	5.00
Norfolk Top Dresser .....	....	7.40	3.00
Nitrate of Soda Mixture for Top Dressing Cotton .....	4.00	8.23	2.00
Nitrate of Soda .....	....	15.00	....

*Nitrate Agencies Company, Norfolk, Va.—*

Acid Phosphate .....	16.00	....	....
Basic Slag .....	14.00	....	....
Ground Tankage .....	11.44	7.40	....
Genuine Peruvian Guano .....	10.00	10.69	2.00
Ground Tankage .....	6.86	5.75	....
Nitrate of Soda .....	....	15.00	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	47.00
Kainit .....	....	....	12.00
Ground Dried Blood .....	....	13.16	....
Cotton-seed Meal .....	....	6.16	....
Sulphate of Ammonia .....	....	20.50	....
Dry Ground Fish .....	....	8.84	....

*New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.—*

Thomas Phosphate .....	18.00	....	....
16% Acid Phosphate .....	16.00	....	....
Bone Meal .....	16.00	2.47	....
14% Acid Phosphate .....	14.00	....	....
Special Corn and Peanut Grower .....	11.00	....	2.00
High Grade Bone and Potash .....	10.00	....	4.00
Carteret Bone and Potash .....	10.00	....	2.00
Greene County Tobacco Fertilizer .....	9.00	2.47	5.00
Sparrow's Special Tobacco Grower .....	9.00	2.47	3.00
Oriole Tobacco Grower .....	8.00	3.30	4.00
Harvey's Special Meal and Fish Guano .....	8.00	2.47	3.00
Foy's High Grade Fertilizer .....	8.00	2.47	3.00
Lenoir Bright Leaf Tobacco Grower .....	8.00	2.47	3.00
Pitt's Prolific Golden Tobacco Guano .....	8.00	2.47	3.00
Favorite Cotton Grower .....	8.00	2.27	2.00
Onslow Farmers Reliance Guano .....	8.00	2.06	3.00
Jones County Premium Crop Grower .....	8.00	2.06	3.00
Craven Cotton Guano .....	8.00	1.65	2.00
Greene County Standard Fertilizer .....	8.00	1.65	2.00
Special Cotton-seed Meal Mixture .....	8.00	2.47	3.00
Dunn's Standard Truck Grower .....	7.00	5.77	7.00
Ives' Irish Potato Guano .....	7.00	4.12	7.00
Nancy Hall Sweet Potato Guano .....	7.00	2.88	10.00
Special Truck Grower .....	7.00	4.12	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Eureka Tobacco Fertilizer .....	6.00	3.30	7.00
Hart's Special Tobacco Grower .....	6.00	2.47	6.00
Pamlico Electric Top Dresser .....	5.00	8.25	2.50
Wootten's Special Tobacco Guano .....	4.00	3.30	6.00
Sulphate of Ammonia .....	....	20.62	....
Nitrate of Soda .....	....	15.67	....
Eureka Top Dresser.....	....	8.28	3.00
High Grade Fish Scrap .....	....	2.85	....
Sulphate of Potash .....	....	....	50.00
Muriate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00
Ground Blood .....	....	13.00	20.00
Cotton-seed Meal .....	....	6.18	....
Ground Tankage .....	....	9.00	....

*G. Ober & Sons Co., Baltimore, Md.—*

Pure Raw Bone Meal .....	21.00	3.71	....
Ober's High Grade Acid Phosphate .....	16.00	....	....
Ober's Dissolved Bone Phosphate .....	14.00	....	....
Ober's Superior Phosphate and Potash .....	12.00	....	2.00
Ober's Dissolved Animal Bone .....	10.00	2.47	....
Ober's Special H. G. Fertilizer .....	9.00	2.47	3.00
Ober's Special Amm. Diss. Bone .....	9.00	1.65	2.00
Ober's Farmers Mixture .....	9.00	.82	2.00
Ober's Harvest King Compound .....	9.00	1.65	3.00
Ober's Harvest King Compound .....	9.00	1.65	3.00
Ober's Special Compound for Tobacco .....	8.00	2.47	3.00
Cooper's Pungo .....	8.00	2.06	2.00
Ober's Complete Guano for all Crops .....	8.00	2.47	3.00
Ober's Standard Tobacco Fertilizer .....	8.00	1.65	2.00
Ober's Special Cotton Compound .....	8.00	1.65	2.00
Ober's Special Tobacco Bed Fertilizer .....	4.00	8.25	3.00
Ober's Dixie Top Dresser .....	....	7.41	3.00

*Old Buck Guano Company, Richmond, Va.—*

Old Buck 16% Acid Phosphate .....	16.00	....	....
Old Buck 14% Acid Phosphate .....	14.00	....	....
Old Buck High Phosphate and Potash .....	12.00	....	2.00
Old Buck Bristol Alkaline Bone .....	12.00	....	5.00
Old Buck High Phosphate and Potash .....	12.00	....	2.00
Old Buck 12% Acid Phosphate .....	12.00	....	....
Old Buck Hartford Bone and Potash .....	10.00	....	2.00
Old Buck German 10-4 Mixture .....	10.00	....	4.00
Old Buck Phospho Alkali .....	10.00	....	6.00
Old Buck English Tobacco Potato and Truck .....	10.00	3.30	6.00
Old Buck Corn Guano .....	10.00	1.65	4.00
Old Buck Hanover Cotton Guano .....	10.00	1.65	2.00
Old Buck Better-Than-Bone .....	9.00	3.71	3.00
Old Buck James River Peanut and Corn ...	9.00	1.00	3.00
Old Buck Chester Guano .....	9.00	2.47	3.00
Old Buck Clifton Cotton Guano .....	9.00	2.26	2.00
Old Buck Western Grain Guano .....	8.00	1.65	3.00
Old Buck Double Potash Guano .....	8.00	1.65	5.00
Old Buck Deep Run Corn and Wheat.....	8.00	1.02	4.00
Old Buck Fairmount Phosphate and Potash .....	8.00	....	4.00
Old Buck Saxon Corn and Tobacco .....	8.00	1.65	2.00
Old Buck High Prize Tobacco .....	8.00	2.05	3.00
Old Buck Quincy Tobacco and Garden .....	8.00	2.47	3.00
Old Buck Test Farm Tobacco .....	8.00	2.47	4.00
Old Buck Tuck-a-ho Cotton Guano .....	8.00	2.05	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Old Buck Guide Post Cotton Guano .....	8.00	2.47	3.00
Old Buck Florida General Trucker .....	8.00	3.30	4.00
Old Buck Warsaw Guano .....	8.00	1.65	2.00
Old Buck Triple Best Gnano .....	8.00	4.11	7.00
Old Buck MacNye's Wheat Formula .....	8.00	.82	3.00
Old Buck Tobacco Special .....	8.00	3.30	4.00
Old Buck State Fair Potato .....	8.00	3.30	8.00
Old Buck C. P. Trucker .....	8.00	4.11	5.00
Old Buck Long Island Cabbage, Potatoes, Onions .....	8.00	4.94	6.00
Old Buck Carolina Berry and Truck .....	7.00	5.76	10.00
Old Buck Water Soluble Top Dresser .....	4.00	8.23	2.00
Old Buck Genuine German Kainit .....	....	....	12.00
Old Buck Muriate of Potash .....	....	....	48.00
Old Buck Nitrate of Soda .....	....	15.35	....
Old Buck Sulphate of Potash .....	....	....	48.00
Old Buck Dried Blood .....	....	13.28	....
Old Buck Tankage .....	....	8.23	....
Old Buck Ground Fish .....	....	8.23	....

*Peruvian Guano Corporation, Charleston, S. C.—*

Thomas Phosphate (Basic Slag) .....	17.00	....	....
Acid Phosphate .....	16.00	....	....
Genuine Peruvian Guano Ex. S. S. Condor .	14.00	2.47	2.00
Genuine Peruvian Guano Ex. S. S. Chipana	14.00	3.29	2.00
Genuine Peruvian Guano Ex. S. S. Capac ..	13.00	4.94	2.00
Acid Phosphate .....	14.00	....	....
Peruvian Guano Ex. S. S. Milverton, No. 2...	14.00	2.47	1.00
Acid Phosphate .....	13.00	....	....
Peruvian Guano Ex. S. S. Milverton, No. 1...	13.00	4.94	1.00
Acid Phosphate .....	12.00	....	....
Peruvian Potash Special .....	10.00	....	4.00
Peruvian Acid Potash Mixture .....	10.00	....	2.00
Peruvian Sulphate Tobacco Mixture .....	10.00	1.65	8.00
High Grade Peruvian Mixture .....	10.00	1.65	2.00
Albatross Peruvian Formula .....	10.00	1.65	4.00
Peruvian Special Tobacco Mixture .....	10.00	2.47	4.00
Chincha Isl. H. G. Peruvian Mixture .....	10.00	3.29	4.00
Peruvian H. G. Potash Mixture .....	10.00	1.65	6.00
Penguin Peruvian Compound .....	10.00	2.47	3.00
Laranago Peruvian Formula .....	9.00	1.65	2.00
Huarez Peruvian Formula .....	9.00	1.65	3.00
Cuzco Peruvian Mixture .....	9.00	1.65	6.00
Sea Island Peruvian Mixture .....	9.00	2.47	3.00
Peruvian Top Dresser .....	8.00	7.00	3.50
Peruvian Acid Potash Mixture .....	8.00	....	4.00
Peruvian Tobacco Mixture .....	8.00	3.29	8.00
Excelsior Peruvian Formula .....	8.00	.83	3.00
Standard Peruvian Mixture .....	8.00	1.65	2.00
Petrel Peruvian Mixture .....	8.00	1.65	4.00
Alcatroz Peruvian Corn Grower .....	8.00	1.65	3.00
Pasco Peruvian Formula .....	8.00	1.65	6.00
Piquero Peruvian Compound .....	8.00	2.47	2.00
Lobos Peruvian Mixture .....	8.00	2.47	3.00
Cormorant H. G. Peruvian Mixture .....	8.00	2.47	4.00
Puno Peruvian Tobacco Formula .....	8.00	2.47	6.00
Bellestas H. G. Peruvian Mixture .....	8.00	3.29	4.00
Peruvian Truck Formula .....	7.00	6.59	5.00
Peruvian Potato Mixture .....	7.00	4.12	5.00
Peruvian H. G. Tobacco Formula .....	7.00	4.12	7.00
Peruvian Sulphate Mixture .....	2.00	5.76	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Muriate of Potash .....	....	....	49.00
Sulphate of Potash .....	....	....	48.00
Nitrate of Soda .....	....	14.82	....
Dried Blood .....	....	13.17	....
Kainit .....	....	....	12.00

*Planters Fertilizer and Phosphate Co., Charleston,  
S. C.—*

Planters H. G. Acid Phosphate .....	16.00	....	....
16% Acid Phosphate .....	16.00	....	....
Planters High Grade Acid Phosphate .....	14.00	....	....
Excelsior H. G. Acid Phosphate .....	14.00	....	....
Planters Soluble Bone .....	13.00	....	....
Planters Bone and Potash .....	12.00	....	1.00
Planters Special Mixture .....	10.00	3.29	....
Planters Special Mixture .....	10.00	2.47	....
Planters Special Meal Mixture .....	10.00	1.65	2.00
Planters Grain Grower .....	10.00	.82	3.00
Special Mixture .....	10.00	....	5.00
Planters Acid and Potash .....	10.00	....	4.00
Planters Bone and Potash .....	10.00	....	2.00
Planters Special Mixture .....	10.00	2.47	1.00
Planters Special Mixture .....	10.00	2.47	2.00
Planters Acid and Potash .....	10.00	....	4.00
Bone and Potash .....	10.00	....	2.00
Planters Special Mixture .....	9.00	2.47	....
Planters Bone and Fish Guano .....	9.00	1.65	3.00
Planters Special Mixture .....	9.00	.82	3.00
Planters Special Mixture .....	8.00	3.29	....
Planters Special Mixture .....	8.00	2.47	....
Planters Special Mixture .....	8.00	2.47	5.00
Planters Special Cotton Fertilizer .....	8.00	3.29	4.00
Planters H. G. Tobacco Fertilizer .....	8.00	2.47	3.00
Planters Bright Tobacco Fertilizer .....	8.00	3.29	4.00
Special Mixture .....	8.00	2.47	3.00
Planters Cotton and Corn Fertilizer .....	8.00	2.47	4.00
Planters Soluble Guano .....	8.00	2.47	3.00
Planters Fertilizer .....	8.00	2.06	2.00
Planters Standard Fertilizer .....	8.00	1.65	2.00
Planters Special Mixture .....	8.00	2.47	1.00
Planters Special Mixture .....	8.00	2.47	2.00
Planters Bone and Potash .....	8.00	....	4.00
Special Mixture .....	7.00	5.76	7.00
Special Mixture .....	7.00	4.11	7.00
Special Mixture .....	7.00	4.11	5.00
Planters Special Mixture .....	4.00	....	3.50
Planters H. G. Top Dresser .....	4.00	6.18	2.50
Nitrate of Soda .....	....	14.83	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Planters German Kainit .....	....	....	12.00

*Palmetto Guano Corporation, Columbia, S. C.—*

Palmetto Acid Phosphate .....	16.00	....	....
Palmetto Acid and Potash Mixture .....	14.00	....	2.00
Palmetto Acid Phosphate .....	14.00	....	....
Palmetto Acid Phosphate .....	13.00	....	....
Palmetto Acid and Potash Mixture .....	12.00	....	2.00
Palmetto Acid and Potash Mixture .....	11.00	....	1.00
Palmetto Corn Grower .....	10.00	4.12	3.00
Palmetto Special Mixture .....	10.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Palmetto Vegetable Special .....	10.00	2.47	2.00
Palmetto Grain Fertilizer .....	10.00	1.65	2.00
Palmetto Standard Guano .....	10.00	1.65	2.00
Palmetto Acid and Potash Mixture .....	10.00	....	2.00
Palmetto State Guano .....	9.20	1.65	2.00
Palmetto Golden Meal Mixture .....	9.20	1.65	2.00
Palmetto Special Mixture .....	9.00	2.47	3.00
Palmetto Special Guano .....	9.00	2.47	2.00
Palmetto Standard Guano .....	9.00	1.65	3.00
Palmetto Grain Fertilizer .....	9.00	.83	3.00
Palmetto Grain Guano .....	9.00	.83	2.00
Palmetto High Grade Guano .....	8.00	2.47	3.00
Palmetto Tobacco Guano .....	8.00	2.47	3.00
Palmetto Golden Tobacco Guano .....	8.00	2.47	2.50
Palmetto Ammoniated Guano .....	8.00	2.06	2.00
Palmetto Blood and Bone Guano .....	8.00	2.06	2.00
Palmetto Standard Fertilizer .....	8.00	2.06	1.00
Palmetto Special Fertilizer .....	8.00	1.65	2.00
Palmetto Irish Potato Mixture .....	7.00	4.62	3.00
Palmetto Irish Potato Mixture .....	6.00	5.76	3.00
Palmetto Special Top Dresser .....	4.00	6.17	2.50
Palmetto Special Top Dresser .....	....	7.41	3.00
Nitrate of Soda .....	....	14.80	....

*The Phosphate Mining Co., Savannah, Ga.—*

Superb Acid Phosphate .....	18.00	....	....
Acid Phosphate .....	17.00	....	....
Superfine Acid Phosphate .....	16.00	....	....
Acid Phosphate .....	15.00	....	....
Superior Acid Phosphate .....	14.00	....	....
Acid Phosphate .....	13.00	....	....
Acid Phosphate .....	12.00	....	....

*Pearsall & Co., Wilmington, N. C.—*

Pearsall's H. G. Acid Phosphate .....	16.00	....	....
Pearsall's H. G. Acid Phosphate .....	14.00	....	....
Pearsall's Bone and Potash .....	10.00	....	2.00
Pearsall's Tobacco Guano .....	9.00	2.47	3.00
Pearsall's Fish and Potash Compound .....	8.00	3.30	4.00
Pearsall's Bone Meal and Fish .....	8.00	3.30	4.00
Pearsall's Berry Guano .....	8.00	2.47	10.00
Pearsall's Fernside Tobacco Guano .....	8.00	2.47	7.00
Pearsall's Useme Guano .....	8.00	2.47	3.00
Pearsall's Tobacco Guano .....	8.00	2.47	3.00
Pearsall's FFFG Guano .....	8.00	2.47	3.00
Oliver's Cotton and Corn Guano .....	8.00	2.07	4.00
Pearsall's Corn Guano .....	8.00	1.65	3.00
Currie's Cotton and Corn Guano .....	8.00	1.65	3.00
Pearsall's Two Step Guano .....	8.00	1.65	2.00
Hall's Special .....	8.00	3.30	4.00
Pearsall's Potato and Truck Guano .....	6.00	4.12	7.00
Pearsall's Complete Top Dresser .....	3.00	7.43	3.00
Pearsall's Top Dresser .....	....	7.43	3.00
Nitrate of Soda .....	....	14.85	....
Ground Fish High Grade .....	....	8.47	....
Pearsall's Bone Meal .....	....	3.30	....
Pearsall's Muriate Potash .....	....	....	48.00
Pearsall's Sulphate Potash .....	....	....	48.00
Pearsall's German Kainit .....	....	....	12.00
Pearsall's German Kainit .....	....	....	20.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Piedmont Electro-Chemical Co., Mt. Holly, N. C.—</i>			
Electro Ammon-Phosphate .....	51.00	11.50	....
Electro Phosphate .....	48.00	....	....
Electro Special Mixture .....	24.00	4.94	1.00
<i>Pamlico Chemical Co., Inc., Washington, N. C.—</i>			
Pamlico H. G. Acid Phosphate .....	16.00	....	....
Pamlico Bone and Potash .....	10.00	....	4.00
Pamlico Bone and Potash Mixture .....	10.00	....	2.00
Bone and Potash Mixture .....	10.00	....	2.00
Martin County Peanut Guano .....	10.00	1.23	4.00
Pamlico Fish Mixture for Tobacco .....	8.00	2.47	3.00
Bissett's Special Cotton Grower .....	8.00	2.06	4.00
Pamlico Special Sweet Potato Guano .....	8.00	2.47	5.00
Cowell's Great Potato Grower .....	8.00	4.12	7.00
Early Sweet Potato Guano .....	8.00	2.47	10.00
Pamlico 8-4-4 Guano .....	8.00	3.30	4.00
Bull's Eye Tobacco Guano .....	8.00	3.30	4.00
Pamlico Fish Mixture for Cotton .....	8.00	2.47	3.00
Pamlico Blood Mixture for Tobacco .....	8.00	2.47	3.00
Quick Grower Guano .....	8.00	2.06	3.00
Rust-Proof Cotton Guano .....	8.00	1.65	3.00
Pamlico High Grade Truck Guano .....	8.00	2.47	3.00
Pamlico High Grade Tobacco Grower .....	8.00	2.47	5.00
Tobacco Growers Friend Guano .....	8.00	2.47	3.00
Success Tobacco Guano .....	8.00	2.47	3.00
Prosperity Cotton Grower .....	9.00	2.26	2.00
Pamlico 8-4-3 Guano .....	8.00	3.29	3.00
Bull's Eye Tobacco Guano .....	8.00	3.29	3.00
Pamlico Bone and Fish Guano .....	8.00	1.65	2.00
Pamlico Special Irish Potato Guano .....	7.00	4.12	7.00
Pamlico Favorite Potato Guano .....	7.00	4.11	5.00
Pamlico High Grade Truck Guano .....	7.00	4.11	5.00
Pamlico 6-7-5 Potato Guano .....	6.00	5.75	5.00
Cowell's Great Cabbage Grower .....	5.00	8.22	2.50
Genuine German Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Pamlico Ground Fish .....	....	8.22	....
Nitrate of Soda .....	....	15.22	....
Cotton Seed Meal .....	....	6.17	....
<i>Phillips Fertilizer Co., Washington, N. C.—</i>			
Phillips 16% Acid Phosphate .....	16.00	....	....
Phillips 4-8-4 Tobacco Guano .....	8.00	3.30	4.00
Phillips 3-8-3 Tobacco Guano .....	8.00	2.47	3.00
Phillips 3-8-3 Cotton and Corn Guano .....	8.00	2.47	3.00
Phillips H. G. Truck Guano for Potatoes and Beets .....	6.00	4.12	7.00
Nitrate of Soda .....	....	14.83	....
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00
Dried Blood .....	....	12.70	....
Fish Scrap .....	....	8.20	....
<i>Patapsco Guano Co., Baltimore, Md.—</i>			
Patapsco Pure Raw Bone .....	21.51	3.70	....
Florida Soluble Phosphate .....	16.00	....	....
Patapsco Pure Dissolved C. S. Phosphate .....	14.00	....	....
Baltimore Soluble Phosphate .....	11.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Patapsco Special Plant Food for Tobacco . . . .	10.00	2.47	3.00
Patapsco Soluble Phosphate and Potash . . . .	10.00	....	2.00
Patapsco Tobacco Fertilizer . . . . .	9.00	2.47	3.00
Patapsco Bright Tobacco Grower . . . . .	9.00	2.26	2.00
Patapsco Guano . . . . .	9.25	2.06	2.00
Patapsco Guano for Tobacco . . . . .	9.25	2.06	2.00
Patapsco Revised Cotton and Corn Special..	9.00	2.06	3.00
Patapsco Cotton Growers Special . . . . .	9.00	1.65	3.00
Coon Brand Guano . . . . .	9.00	.82	3.00
Choctaw Guano . . . . .	8.00	2.47	3.00
Chippewa Guano . . . . .	8.00	2.47	3.00
Patapsco Revised Cotton and Tobacco Special	8.00	3.29	3.00
Patapsco Gold Leaf C. S. M. Mixture . . . . .	8.00	2.47	3.00
Patapsco H. G. Tobacco Special . . . . .	8.00	2.47	3.00
Unicorn Guano . . . . .	8.00	2.06	3.00
Patapsco Special Tobacco Mixture . . . . .	8.00	2.06	3.00
Sea Gull Ammoniated Guano . . . . .	8.00	1.65	2.00
Planters Favorite . . . . .	8.00	1.65	2.00
Grange Mixture C. S. M. Base . . . . .	8.00	1.65	2.00
Patapsco Trucker for Early Vegetables . . . .	7.00	4.11	5.00
Patapsco Vegetable Grower . . . . .	7.00	4.11	3.00
Patapsco Special Potato Guano . . . . .	6.00	5.76	5.00
Patapsco Special Potato Grower . . . . .	6.00	5.76	3.00
Dry Ground Fish . . . . .Total	6.00	8.23	....
Patapsco Top Dresser . . . . .	....	7.41	3.00
Nitrate of Soda . . . . .	....	15.00	....

*Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.—*

Acid Phosphate . . . . .	16.00	....	....
Royal Cotton Grower . . . . .	9.00	2.26	2.00
J. P. D. Special . . . . .	8.00	3.29	5.00
Gorham's High Grade . . . . .	8.00	3.29	4.00
Tar River Special . . . . .	8.00	2.47	3.00
Planters C. S. Oil Co.'s Tobacco Guano . . . .	8.00	2.47	3.00
Planters C. S. Oil Co.'s Cotton Guano . . . . .	8.00	1.65	2.00
Planters Peanut Mixture . . . . .	8.00	1.21	5.00
Planters Pride for Cotton . . . . .	8.00	1.65	2.00
Brake's Corn Special . . . . .	8.00	1.65	7.00
Robertson's Tobacco Mixture . . . . .	8.00	2.47	5.00
Thorne's Cotton King . . . . .	8.00	3.29	4.00
Planters Special Potato Guano . . . . .	7.00	4.12	5.00
E. L. D. Special . . . . .	7.00	2.47	3.00
Braswell's Special for Tobacco . . . . .	7.00	2.26	3.50
Braswell's Excelsior . . . . .	7.00	3.29	6.00
Planters Top Dresser . . . . .	3.50	7.82	3.00
9-4 Top Dresser . . . . .	....	7.40	4.00
Genuine German Kainit . . . . .	....	....	12.00
Ground Fish Scrap . . . . .	....	8.23	....
Muriate of Potash . . . . .	....	....	50.00
Sulphate of Potash . . . . .	....	....	48.00
Nitrate of Soda . . . . .	....	15.00	....
9-4 Top Dresser . . . . .	....	7.40	4.00

*Pocahontas Guano Co., Lynchburg, Va.—*

Carrington's S. C. Phosphate, Waukesha Brand	16.00	....	....
Dissolved S. S. Phosphate . . . . .	14.00	....	....
Carrington's Superior Grain Compound . . . .	10.00	....	2.00
Pocahontas Special Tobacco Fertilizer . . . .	9.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Standard Tobacco Guano, Old Chief Brand..	9.00	1.65	2.00
Yellow Tobacco Special .....	9.00	1.65	2.00
Carrington's Lucky Strike .....	9.00	1.65	3.00
Mohawk King .....	9.00	1.85	4.00
H. G. Tobacco Compound, Mohawk King ....	9.00	1.85	3.00
Farmers Favorite Guano Apex Brand .....	8.00	2.47	3.00
Spot Cash Tobacco Compound .....	8.00	2.06	3.00
Carrington's Banner Brand Guano .....	8.00	1.65	2.00
A. A. Complete Champion Brand .....	8.00	1.03	3.00
Indian Tobacco Grower .....	8.00	2.47	3.00

*Powhatan Chemical Co., Richmond, Va.—*

Pure Animal Bone .....	25.00	2.47	....
Pure Raw Bone Meal .....	22.50	3.70	....
Rex Dissolved Bone Phosphate .....	16.00	....	....
High Grade Acid Phosphate .....	14.00	....	....
Bone and Potash Mixture .....	14.00	....	2.00
Powhatan Acid Phosphate .....	12.00	....	....
Magic Corn Special Fertilizer .....	12.00	1.00	2.00
Magic Wheat Special .....	12.00	1.00	2.00
High Grade Bone and Potash Mixture .....	12.00	....	5.00
Virginia Dissolved Bone .....	12.00	....	....
Magic Corn Grower .....	10.00	.82	1.00
Magic Crop Grower .....	10.00	.82	1.00
Magic Bone and Potash Mixture .....	10.00	....	4.00
Bone and Potash Mixture .....	10.00	....	2.00
Economic Cotton Grower .....	9.00	2.26	2.00
Johnson's Best Fertilizer .....	9.00	2.06	5.00
Holt's Magic Fertilizer .....	9.00	2.06	5.00
Union Magic Fertilizer .....	9.00	1.85	4.00
North Carolina Favorite .....	9.00	1.65	3.00
Powhatan Special Fertilizer .....	9.00	1.65	2.00
Magic Mixture .....	9.00	1.65	1.00
Magic Wheat Grower .....	9.00	.82	2.00
Austin's Special Fertilizer .....	9.00	2.47	6.00
Guilford's Special Tobacco Fertilizer .....	9.00	2.47	6.00
Ralling's Special Fertilizer .....	9.00	2.47	2.00
Powhatan Grain Guano .....	9.00	.82	3.00
S. C. Special Fertilizer .....	8.00	2.47	2.00
White Leaf Tobacco Fertilizer .....	8.00	2.06	3.00
King Brand Fertilizer .....	8.00	2.06	3.00
Powhatan Peanut Fertilizer .....	8.00	1.65	4.00
Magic Special Fertilizer .....	8.00	1.65	2.00
Magic Tobacco Grower .....	8.00	1.65	2.00
Magic Cotton Grower .....	8.00	1.65	2.00
Magic Peanut Special .....	8.00	.82	4.00
Magic Grain Special .....	8.00	.82	4.00
P. C. Co.'s Hustler Tobacco Guano .....	8.00	2.47	4.00
King Trucker .....	8.00	4.11	5.00
Tomlinson's Best Fertilizer .....	8.00	3.70	7.00
Copeland's Magic Fertilizer .....	8.00	3.29	8.00
Powhatan Special Fertilizer .....	8.00	3.29	6.00
North State Special .....	8.00	3.29	4.00
Tomlinson's Favorite Fertilizer .....	8.00	2.88	5.00
Tomlinson's Magic Fertilizer .....	8.00	2.47	7.00
Special Fertilizer .....	8.00	2.47	7.00
Tomlinson's Special Fertilizer .....	8.00	2.47	5.00
Magic Fertilizer .....	8.00	2.47	4.00
P. C. Co.'s Hustler .....	8.00	2.47	3.00
Johnson's Special Fertilizer .....	8.00	2.47	3.00
Magic Grain and Grass Grower .....	8.00	....	4.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Magic Peanut Grower .....	8.00	....	4.00
Powhatan Bone and Potash Mixture .....	8.00	....	4.00
Powhatan Trucker .....	7.00	4.94	5.00
Copeland's Best Fertilizer .....	7.00	2.88	7.00
Allen's Special Tobacco Fertilizer .....	6.00	1.65	5.00
Special Tobacco Fertilizer .....	6.00	3.29	4.00
Copeland's Special Fertilizer .....	6.00	3.29	7.00
Powhatan Top Dresser .....	4.00	8.23	4.00
Magic Top Dresser .....	4.00	6.17	2.50
Special Fertilizer .....	4.00	3.29	6.00
Tomlinson's Nitrate Muriate Special .....	....	9.87	5.00
High Grade German Potash .....	....	....	16.00
Pure German Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	48.00
Nitrate of Soda .....	....	14.80	....
Sulphate of Ammonia .....	....	19.75	....

*Pocomoke Guano Co., Norfolk, Va.—*

Pure Ground Bone .....	20.00	3.70	....
Superb Acid Phosphate .....	16.00	....	....
Peerless Acid Phosphate .....	14.00	....	....
Alkali Bone .....	11.00	....	2.00
Pocomoke Bone and Potash Mixture .....	10.00	....	4.00
10-2 Mixture Potash .....	10.00	....	2.00
Pocomoke Special Tobacco Manure .....	9.00	2.47	3.00
Monticello Special .....	9.00	1.85	3.00
Faultless Ammoniated Super Phosphate ....	8.00	3.29	4.00
Pocomoke H. G. Tobacco Guano .....	8.00	3.29	4.00
Pocomoke Special 1-8-3 .....	8.00	.82	3.00
Pocomoke Special 1-3 .....	8.00	.82	3.00
Pocomoke 1¼-8-3 Special .....	8.00	1.03	3.00
Pamlico Super Phosphate .....	8.00	1.65	2.00
Pocomoke Super Phosphate .....	8.50	1.65	2.00
Electric Crop Grower .....	8.50	1.65	2.00
C. C. C. Crescent Complete Compound .....	8.00	1.65	3.00
Cinco Tobacco Guano .....	8.50	2.06	2.50
Monarch Tobacco Grower .....	8.00	2.47	3.00
Harvey's High Grade Monarch .....	8.00	2.47	3.00
Pocomoke Sweet Potato Grower .....	8.00	2.47	3.00
Faultless Special .....	8.00	3.29	3.00
Pocomoke 4-8-3 Tobacco Guano .....	8.00	3.29	3.00
Pocomoke 5-7-3 Trucker .....	7.00	4.11	3.00
Standard Truck Guano .....	7.00	4.11	5.00
Pocomoke Truck Grower 5% .....	7.00	4.11	5.00
Pocomoke 7-6-3 Trucker .....	6.00	5.76	3.00
Seaboard Popular Trucker .....	6.00	5.76	5.00
Freeman's 7% Irish Potato Grower .....	6.00	5.76	5.00
Coast Line Truck Guano .....	5.00	8.23	3.00
Pocomoke Top Dresser .....	4.00	8.23	2.00
Dry Ground Fish .....	....	8.23	....
Special Top Dresser .....	....	7.41	3.00
Nitrate of Soda .....	....	15.00	....

*Paisley Boney, Goldsboro, N. C.—*

16% Acid Phosphate .....	16.00	....	....
14% Acid Phosphate .....	14.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Reidsville Fertilizer Co., Inc., Reidsville, N. C.—</i>			
Reidsville Acid .....	16.00	....	....
Bone and Potash .....	15.00	....	1.00
Acid and Potash .....	14.00	....	3.00
Burton's Corn Grower .....	12.00	....	5.00
Williams, No. 3 .....	12.00	2.47	3.00
Williams, No. 2 .....	10.00	2.47	3.00
Williams, No. 4 .....	10.50	3.30	4.00
Williams, No. 1 .....	10.00	1.65	2.00
Harvest King .....	10.00	.82	4.00
Acid and Potash .....	10.00	....	4.00
Acid and Potash .....	10.00	....	2.00
Gold Standard .....	10.00	2.47	5.00
Lion Brand Fertilizer .....	9.00	2.47	6.00
Reidsville Hustler .....	9.00	.82	2.00
Money Maker .....	9.00	2.47	3.00
Reidsville Hustler Special .....	9.00	.82	3.00
Broad Leaf Special .....	9.00	1.85	4.00
Reidsville Best .....	8.00	3.30	8.00
Farmers Tobacco Fertilizer .....	8.00	2.47	3.00
Royal Fertilizer .....	8.00	2.47	3.00
Climax Fertilizer .....	8.00	2.06	3.00
Broad Leaf Tobacco Guano .....	8.00	1.85	2.50
Banner Fertilizer .....	8.00	1.65	2.00
Champion Guano .....	8.00	1.65	2.00
Reidsville Champion .....	8.00	1.65	2.00
Burton's Special .....	8.00	.82	3.00
Acid and Potash .....	8.00	....	4.00
Climax Special .....	8.00	2.06	5.00
Plant Bed Special .....	8.00	....	2.00
Williams, No. 5 .....	8.00	1.65	2.00
Williams, No. 6 .....	8.00	2.47	3.00
Reidsville Top Dresser .....	5.00	4.94	1.75
<i>Robersonville Guano Co., Robersonville, N. C.—</i>			
Roberson's H. G. Acid Phosphate .....	16.00	....	....
Roberson's H. G. Tobacco Guano .....	8.00	2.47	3.00
Roberson's H. G. Fish and Meal Guano .....	8.00	2.47	3.00
Roberson's H. G. Truck Guano .....	7.00	4.12	5.00
Roberson's Genuine German Kainit .....	....	....	12.00
<i>Robeson Manufacturing Co., Lumberton, N. C.—</i>			
"1915-C" .....	10.00	1.65	....
"1915-E" .....	10.00	2.47	1.00
16% Acid Phosphate .....	16.00	....	....
"1915-A" .....	9.00	2.47	2.00
"1915-D" .....	9.00	1.65	1.00
Silver Dollar .....	8.00	2.47	3.00
Globe (Tobacco Special) .....	8.00	2.47	5.00
"1915-B" .....	8.00	3.30	1.00
<i>Read Phosphate Co., Charleston, S. C.—</i>			
Read's H. G. Dissolved Bone .....	16.00	....	....
Read's H. G. Acid Phosphate .....	14.00	....	....
Read's Bone and Potash .....	10.00	....	4.00
Read's Alkaline Bone .....	10.00	....	2.00
Read's Manipulated Guano .....	9.00	2.46	2.00
Read's H. G. Cotton Guano .....	8.00	4.12	7.00
Read's Ammoniated Dissolved Bone .....	8.00	3.30	6.00
Read's H. G. Guano .....	8.00	3.30	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Read's H. G. Tobacco Leaf .....	8.00	2.47	3.00
Read's H. G. Cotton Grower .....	8.00	2.47	3.00
Read's Soluble Fish Guano .....	8.00	1.65	2.00
Read's Blood and Bone Fertilizer, No. 1 .....	8.00	1.65	2.00
Read's Special Potash Mixture .....	8.00	....	4.00
Read's Cotton Flower .....	8.00	2.05	1.00
Read's Paramount Fertilizer .....	8.00	2.46	2.00
Read's Standard Guano .....	8.00	2.05	2.00
Read's Fish and Blood Mixture .....	7.00	3.30	5.00
Read's Top Dresser .....	2.00	5.15	2.50
Nitrate of Soda .....	....	.19	....
Muriate of Potash .....	....	....	48.00
German Kainit .....	....	....	12.00

*Richmond Guano Co., Richmond, Va.—*

Sanders Special Formula for Bright Tobacco	9.00	2.88	5.00
Collin's Special Fertilizer .....	9.00	2.47	2.00
Carolina Cotton Grower .....	9.00	2.26	2.00
Burton's Special Tobacco Fertilizer .....	9.00	2.06	3.00
Southern Trucker .....	8.00	4.11	5.00
Special Fertilizer .....	8.00	3.29	6.00
Blood and Bone Special .....	8.00	3.29	6.00
Perfection Special .....	8.00	3.29	4.00
Gilt Edge Fertilizer .....	8.00	2.47	3.00
Gilt Edge Tobacco Fertilizer .....	8.00	2.47	3.00
Carolina Bright Tobacco Fertilizer .....	8.00	2.47	3.00
Beeson's Best Fertilizer .....	8.00	2.47	10.00
Carolina Bright Special Tobacco Fertilizer..	8.00	2.26	2.50
Special High Grade for Truck .....	7.00	4.94	5.00
Clark's Special Formula .....	7.00	4.94	6.00
10% Cabbage Guano .....	6.00	8.23	2.00
Smith's 7% Special .....	6.00	5.76	5.00
Edwards Prolific Corn Grower .....	6.00	3.29	4.00
Gilt Edge Top Dresser .....	4.00	8.23	4.00
Premium Top Dresser .....	4.00	6.17	2.50
Carter's Special for Tobacco .....	4.00	2.47	6.00
Special Top Dresser .....	....	7.40	3.00

*Rasin Monumental Co., Baltimore, Md.—*

Rasin's Big Sixteen Alkaline Compound ....	16.00	....	2.00
Rasin's 16% Acid Phosphate .....	16.00	....	....
Rasin's Great Alkaline Grain Cover .....	14.00	....	2.00
Rasin's Acid Phosphate .....	14.00	....	....
Rasin's 13% Acid Phosphate .....	13.00	....	....
Rasin's Search Light Fmergency Compound	12.00	1.65	3.00
Rasin's Great Ammoniated Crop Compound..	12.00	.82	3.00
Rasin's High Grade Bone and Potash .....	12.00	....	5.00
Rasin's Victoria Bone .....	12.00	....	2.00
Rasin's Quality Compound .....	12.00	1.65	1.00
Rasin's Prize Special Formula .....	11.00	....	2.00
Rasin's Big Ton .....	10.00	3.29	4.00
Rasin's Home Run Guano .....	10.00	1.65	3.00
Rasin's Honey Bee Guano .....	10.00	.82	2.00
Rasin's Seawall Alkaline Phosphate .....	10.00	....	6.00
Rasin's Special Bone and Potash .....	10.00	....	5.00
Rasin's Double Bone and Potash .....	10.00	....	4.00
Rasin's Bone and Potash .....	10.00	....	2.00
Rasin's Dixie Guano .....	9.00	1.65	2.00
Baltimore Special Mixture .....	9.00	.82	2 00
Rasin's Dixie Cotton Guano .....	9.00	2.26	2.00
Rasin's 9-3-3 Guano .....	9.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Rasin's Sunlight Guano .....	9.00	1.65	3.00
Rasin's Capital Crop Compound .....	9.00	.82	3.00
Rasin's Indian Brand for Tobacco .....	8.00	2.47	3.00
Rasin's Special Fertilizer .....	8.00	2.06	3.00
Rasin's Gold Standard .....	8.00	2.47	3.00
Rasin's General Tobacco Grower .....	8.00	2.06	3.00
Rasin's Dixie H. G. Guano .....	8.00	3.29	4.00
Rasin's Old Empire Guano .....	8.00	1.65	2.00
Rasin's Old Empire Guano Special .....	8.00	2.47	3.00
Rasin's Complete Cotton Compound .....	8.00	2.47	3.00
Rasin's Seawall Special Guano .....	8.00	2.47	5.00
Arundel Complete .....	8.00	1.65	2.00
Rasin's Best Wheat and Grass Producer ....	8.00	1.23	3.00
Rasin's Seawall Complete Manure .....	8.00	2.47	4.00
Rasin's Victoria Guano .....	8.00	3.29	4.00
Rasin's Empire Tobacco Special .....	8.00	2.47	3.00
Rasin's Special Tobacco Guano .....	8.00	2.88	7.00
Rasin's Electric Truck and Vegetable Comp.	8.00	4.12	3.00
Rasin's Champion Potato and Vegetable Ma- nure .....	8.00	3.29	3.00
Rasin's Royal Fish Bone and Potash .....	8.00	1.65	3.00
Rasin's 8-4 Bone and Potash .....	8.00	....	4.00
Rasin's Truck Guano .....	7.00	3.29	2.00
Rasin's Irish Potato Special .....	7.00	3.29	8.00
Rasin's Truckers' Mixture .....	6.00	5.76	5.00
Rasin's 7% Truck Compound .....	6.00	5.76	3.00
Rasin's Dixie Tobacco Compound .....	6.00	3.29	7.00

*Robertson Fertilizer Co., Norfolk, Va.—*

Robertson's Raw Bone Meal .....	21.00	3.70	....
High Peak Acid Phosphate .....	16.00	....	....
Scepter Brand Acid Phosphate .....	14.00	....	....
Robertson's 14-2 Bone and Potash .....	14.00	....	2.00
P. M. C. Acid Phosphate .....	13.00	....	....
Robertson's 12-2 Bone and Potash .....	12.00	....	2.00
Level Run Dissolved Bone and Potash .....	10.00	....	2.00
Skyscraper Bone and Potash Compound .....	10.00	....	4.00
Beaver Special Guano .....	9.00	1.86	3.00
Dodson's Choice H. G. Compound Manure ..	9.00	2.47	3.00
Robertson's Blood and Bone Mixture .....	9.00	1.00	2.00
Beaver Brand Soluble Guano .....	9.00	1.85	4.00
Robertson's Special Formula for Tobacco ...	8.00	2.47	3.00
Robertson's 1-8-3 .....	8.00	.82	3.00
Robertson's 2-8-3 .....	8.00	1.65	3.00
Ten Strike Soluble Crop Producer .....	8.00	1.00	4.00
Robertson's Soluble H. G. Guano .....	8.00	2.47	4.00
Dodson's Special Tobacco Guano .....	8.00	2.06	3.00
Yellow Jacket Tobacco Guano .....	8.00	1.85	4.00
Old Kentucky Home H. G. Tobacco Manure ..	8.00	2.47	3.00
Woods Winner H. G. Guano .....	8.00	3.30	4.00
Robertson's 2½-8-3 .....	8.00	2.06	3.00
Big Cropper High Grade Guano .....	8.00	2.47	3.00
Robertson's X (T) Ray Tobacco Grower ...	8.00	2.06	2.00
Double Dollar Tobacco Guano .....	8.00	1.65	2.00
Double Dollar Soluble Guano .....	8.00	1.65	2.00
Robertson's 5% Guano .....	7.00	4.12	5.00
Robertson's 7% for Truck .....	6.00	5.76	5.00
Fish Guano .....	....	8.22	....
Nitrate of Soda .....	....	14.85	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Richmond Guano Co., Richmond, Va.—</i>			
Pure Animal Bone .....	25.00	2.47	....
Pure Raw Bone Meal .....	22.50	3.70	....
Rex Dissolved Bone Phosphate .....	16.00	....	....
Bone and Potash Mixture .....	14.00	....	2.00
High Grade Acid Phosphate .....	14.00	....	....
Premium Bone and Potash Mixture .....	13.00	....	3.00
Premium Dissolved Bone .....	13.00	....	....
Premium Corn Special .....	12.00	1.00	2.00
Premium Wheat Special .....	12.00	1.00	2.00
H. G. Bone and Potash Mixture .....	12.00	....	5.00
Regal Bone and Potash Mixture .....	12.00	....	4.00
Dissolved S. C. Phosphate .....	12.00	....	....
Old Homestead Dissolved Bone .....	12.00	....	....
Premium Corn Grower .....	10.00	.82	1.00
Premium Crop Grower .....	10.00	.82	1.00
Bone Mixture .....	10.00	.82	1.00
Johnson's Best Bone and Potash .....	10.00	....	5.00
Rex Bone and Potash Mixture .....	10.00	....	4.00
Bone and Potash Mixture .....	10.00	....	2.00
C. & B.'s Best Fertilizer .....	9.00	1.65	3.00
Bumper Crop Ammoniated Guano .....	9.00	1.65	3.00
Lowry's Special Fertilizer .....	9.00	1.65	3.00
Cracker Jack Fertilizer .....	9.00	1.65	2.00
Bone Mixture .....	9.00	1.65	1.00
Premium Cotton Grower .....	9.00	.82	3.00
Premium Wheat Grower .....	9.00	.82	2.00
Tip Top Grain Guano .....	9.00	.82	3.00
Tip Top Fertilizer .....	8.00	2.06	3.00
Tip Top Tobacco Fertilizer .....	8.00	2.06	3.00
Special Premium Brand for Tobacco.....	8.00	1.85	2.25
Special Premium Brand for Plants.....	8.00	1.85	2.25
Carolina Bright for Cotton .....	8.00	2.06	1.50
Beeson's Favorite Fertilizer .....	8.00	1.65	10.00
Rex Ammoniated Crop Grower .....	8.00	1.65	3.00
Rex Tobacco Fertilizer .....	8.00	1.65	4.00
Edgecombe Cotton Grower .....	8.00	1.65	2.00
Premium Tobacco Fertilizer .....	8.00	1.65	2.00
Premium Brand Fertilizer .....	8.00	1.65	2.00
Premium Cotton Fertilizer .....	8.00	1.65	2.00
Premium Peanut Special .....	8.00	.82	4.00
Premium Grain Special .....	8.00	.82	4.00
Tip Top Bone and Potash Mixture .....	8.00	....	4.00
Winter Grain and Grass Grower .....	8.00	....	4.00
Premium Peanut Grower .....	8.00	....	4.00
7% Truck Fertilizer .....	6.00	5.76	5.00
Smith's Special Fertilizer .....	4.00	1.65	7.00
Pure German Kainit .....	....	....	12.00
High Grade German Potash .....	....	....	16.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	48.00
Sulphate of Ammonia .....	....	19.75	....
Nitrate of Soda .....	....	14.80	....

*F. S. Royster Guano Co., Norfolk, Va.—*

Pure Raw Bone Meal .....	21.50	3.71	....
Arrow Brand Thomas Phosphate .....	17.00	....	....
Royster's H. G. 17% Acid Phosphate .....	17.00	....	....
Royster's H. G. 16% Acid Phosphate .....	16.00	....	....
Royster's H. G. 14% Acid Phosphate .....	14.00	....	....
Royster's Dissolved Bone .....	13.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Spearhead Crop Grower .....	12.00	....	6.00
Royster's 12-5 Bone and Potash Mixture ...	12.00	....	5.00
Royster's 12-2 Bone and Potash Mixture ...	12.00	....	2.00
Roysters XX Acid Phosphate .....	12.00	....	....
Royster's 11-5 Bone and Potash Mixture ....	11.00	....	5.00
Royster's Cotton Special .....	10.00	3.30	4.00
Kingfish H. G. Fertilizer .....	10.00	2.47	3.00
Royster's Soluble Guano .....	10.00	1.65	2.00
Haywood Special Guano .....	10.00	.82	3.00
Royster's 10-6 Bone and Potash Mixture ...	10.00	....	6.00
Royster's 10-5 Bone and Potash Mixture ...	10.00	....	5.00
Royster's 10-4 Bone and Potash Mixture ...	10.00	....	4.00
Royster's Bone and Potash for Grain .....	10.00	....	3.00
Royster's Bone and Potash Mixture .....	10.00	....	2.00
Tomlinson's Special .....	9.00	2.47	5.00
Royster's 9-3-4 Special .....	9.00	2.47	4.00
Surry Special Tobacco Grower .....	9.00	2.47	3.00
Piedmont Special Cotton Grower .....	9.00	2.47	3.00
Royster's Meal Mixture .....	9.00	2.26	2.00
Royster's Cotton Grower .....	9.00	2.26	2.00
Viking Ammoniated Guano .....	9.00	1.65	3.00
Royster's Honey Bee Special Comp. ....	9.00	1.65	1.00
Royster's Grain Guano .....	9.00	.82	3.00
Bison Special Fertilizer .....	9.00	.82	2.00
Royster's Nectar Special Fertilizer .....	8.00	3.30	6.00
Stellar Cotton Grower .....	8.00	2.47	1.50
Gorham's Special .....	8.00	3.30	2.50
Royster's Spearhead H. G. Guano .....	8.00	2.47	4.00
Argus Cotton Guano .....	8.00	2.47	3.00
Trucker's Delight .....	8.00	3.30	4.00
Touraine Tobacco Fertilizer .....	8.00	4.12	7.00
Royster's Best Guano .....	8.00	3.71	7.00
Cobb's H. G. for Tobacco .....	8.00	3.30	5.00
Cobb's H. G. for Cotton .....	8.00	3.30	5.00
Ibex Sweet Potato Grower .....	8.00	3.30	5.00
Milo Tobacco Guano .....	8.00	3.30	4.00
Royster's H. G. Special Tobacco Guano ....	8.00	3.30	4.00
Jupiter High Grade Guano .....	8.00	3.30	4.00
Royster's Polo Tobacco Guano .....	8.00	2.88	5.00
Eagle's Special Tobacco Guano .....	8.00	2.47	5.00
Bonanza Tobacco Guano .....	8.00	2.47	3.00
Marlboro High Grade Cotton Grower .....	8.00	2.47	3.00
Royster's Special Sweet Potato Guano .....	8.00	2.47	3.00
Orinoco Tobacco Guano .....	8.00	2.06	3.00
Special Tobacco Compound .....	8.00	2.06	2.00
Royster's Fish Flesh and Fowl .....	8.00	1.65	3.00
Royster's Special Wheat Fertilizer .....	8.00	1.65	2.00
Royster's Complete Guano .....	8.00	1.65	2.00
Farmers' Bone Fertilizer .....	8.00	1.65	2.00
Farmer's Bone Fertilizer for Tobacco .....	8.00	1.65	2.00
Sambo Peanut Grower .....	8.00	1.02	4.00
Royster's Harvest Home Fertilizer .....	8.00	1.02	4.00
Royster's 8-4 Bone and Potash Mixture ....	8.00	....	4.00
Lenoir Special Tobacco Guano .....	8.00	2.88	7.00
Delta Ammoniated Guano .....	8.00	2.47	2.00
Royster's Mustang Special Guano .....	8.00	3.30	3.00
Royster's Orchard Special .....	7.00	1.65	5.00
Zodiac Truck Guano .....	7.00	5.76	5.00
Royster's Special 7% Truck Guano .....	7.00	5.77	7.00
Royster's Early Truck Guano .....	7.00	4.12	8.00
Royster's Domino Potato Guano .....	7.00	4.12	7.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Royster's Ripper Potato Guano .....	7.00	4.12	5.00
Royster's Special Corn and Tomato Guano..	7.00	1.65	5.00
Royster's Peanut Special .....	7.00	....	5.00
Royster's 7-5 Bone and Potash Mixture ....	7.00	....	5.00
Velox Potato Guano .....	6.00	4.12	5.00
Royster's Tobacco Manure .....	6.00	3.30	7.00
Royster's Early Sweet Potato Grower .....	6.00	3.30	5.00
Arrow 7% Potato Guano .....	6.00	5.77	5.00
Royster's Irish Potato Guano .....	6.00	4.12	7.00
Pasquotank Potato Guano .....	6.00	3.30	8.00
Oakley's Special Tobacco Guano .....	6.00	3.30	4.00
Heatherbloom H. G. Guano .....	6.00	3.30	4.00
Raven H. G. Guano .....	6.00	2.47	5.00
Royster's Hercules Fertilizer .....	6.00	1.65	5.00
Royster Dolphin 10% Truck Guano .....	5.00	8.22	3.00
Royster's Greenleaf Trucker .....	5.00	8.22	2.50
Royster's Cabbage Guano .....	5.00	8.22	2.50
Norva Truck Compound .....	5.00	5.77	5.00
Ben's Favorite .....	4.00	3.30	4.00
Presto Top Dresser .....	4.00	8.22	4.00
Royster's Special Top Dresser .....	4.00	6.18	2.50
Currituck Sweet Potato Guano .....	4.00	2.47	8.00
Royster's Ground Fish Scrap .....	3.00	8.22	....
Royster's Locomotive Top Dresser .....	2.00	8.22	5.00
Nitrate of Soda .....	....	15.22	....
Magic Top Dresser .....	....	7.42	3.00
Cotton Seed Meal .....	....	6.17	....
Sulphate of Potash .....	....	....	48.00
Muriate of Potash .....	....	....	48.00
Manure Salts .....	....	....	20.00
Genuine German Kainit .....	....	....	12.00

*Scotland Neck Guano Co., Scotland Neck, N. C.—*

Our 16% Acid Phosphate .....	16.00	....	....
Our Bone and Potash Mixture .....	10.00	....	4.00
Biggs H. G. Truck Guano .....	8.00	4.12	5.00
Noah Biggs C. S. M. and Fish Scrap Guano .....	8.00	3.30	4.00
Noah Biggs Special Tobacco Guano .....	8.00	2.47	4.00
Johnson's Bright Leaf Tobacco Guano .....	8.00	2.47	3.00
State Farm C. S. M. and Fish Scrap Guano ..	8.00	2.47	3.00
Farmers C. S. M. and Fish Scrap Guano ....	8.00	2.06	2.50
Our Special C. S. Meal Guano .....	8.00	1.65	2.00
Our Special 8-4-2 C. S. M. and Fish Scrap Guano .....	8.00	3.30	2.00
Our Special 8-3-2 C. S. M. and Fish Scrap Guano .....	8.00	2.47	2.00
Our Special 8-3-1 C. S. M. and Fish Scrap Guano .....	8.00	2.47	1.00
Johnson's Special Potato Guano .....	7.00	5.77	7.00
Our Best Peanut Guano .....	5.50	1.23	5.50
K. Elite Top Dresser .....	3.00	7.40	3.50
Nitrate of Soda .....	....	15.50	....
Noah Biggs Top Dresser .....	....	7.46	3.50
Our Genuine German Kainit .....	....	....	12.00

*Spartanburg Fertilizer Co., Spartanburg, S. C.—*

16% Acid Phosphate .....	16.00	....	....
14% Acid Phosphate .....	14.00	....	....
13-3 .....	13.00	....	3.00
11-1 .....	11.00	....	1.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
10-2 .....	10.00	....	2.00
10-4 .....	10.00	....	4.00
Corn Formula .....	10.50	1.65	5.00
Grain Compound .....	9.20	1.65	2.00
Boll Buster .....	9.20	1.65	2.00
Corn Grower .....	8.00	1.65	2.00
C. C. & O. Special .....	8.00	1.65	2.00
Glencoe .....	8.00	2.46	3.00
Potato Guano .....	7.00	2.46	7.00
Nitrate of Soda .....	....	14.81	....
Sulphate Ammonia .....	....	20.65	....
Muriate Potash .....	....	....	48.00
Kainit .....	....	....	12.00

*Southern Chemical Company, Inc.,  
Roanoke, Va.—*

Pure Raw Bone .....	Total	22.00	3.70	....
Our Leader .....		9.00	1.65	3.00
Our Favorite .....		8.00	1.65	2.00
Pride of Virginia .....		8.00	2.46	3.00

*Southern Cotton Oil Company, Concord, David-  
son, Gibson, Monroe, Shelby, Wadesboro.—*

S. C. O. Co. 16% Acid Phosphate .....	16.00	....	....
Gold Seal 14% Acid Phosphate .....	14.00	....	....
Conqueror Bone and Potash .....	10.00	....	4.00
Magnolia Bone and Potash .....	10.00	....	2.00
Uncle Sam .....	9.00	2.47	3.00
Home-made .....	9.00	2.05	3.00
Razem .....	9.00	1.65	3.00
King Bee .....	9.17	1.65	2.00
Special Grain Grower .....	9.00	.82	3.00
Choice .....	8.00	3.30	6.00
Conqueror .....	8.00	3.30	4.00
Canto .....	8.00	3.29	6.00
Melonite .....	8.00	3.29	4.00
Peacock .....	8.00	2.47	3.00
Moon .....	8.00	2.47	3.00
Landsake .....	8.00	2.47	2.50
Red Bull .....	8.00	2.06	2.00
Al-to-Good .....	8.00	2.05	3.00
Gloria .....	8.00	1.65	2.00
Double Two .....	8.00	1.65	2.00
Special Ash Element .....	8.50	....	3.50
S. C. O. Co. Ash Element .....	7.50	....	4.50
Dandy Top Dresser .....	4.00	9.07	2.50
Peerless Top Dresser .....	4.00	6.17	2.50
Nitrate of Soda .....	....	15.00	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00
Special Top Dresser .....	....	8.22	3.00
Cotton-seed Meal .....	....	6.18	....

*Swift & Co. Fertilizer Works, Charlotte, N. C.,  
Wilmington, N. C., Chester S. C., Colum-  
bia, S. C.—*

Swift's Raw Bone Meal .....	23.00	3.70	....
Swift's Pure Bone Meal .....	23.00	2.47	....
Swift's Special .....	16.00	....	....



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Swift's Cultivator .....	14.00	....	....
Swift's Harrow .....	13.00	....	....
Corn and Cotton Fertilizer .....	12.00	2.47	2.00
Swift's N. C. Special .....	12.00	1.65	2.00
Swift's Corn and Cotton Fertilizer .....	12.00	1.65	1.00
Swift's Special .....	12.00	....	6.00
Swift's Atlanta .....	12.00	....	4.00
Swift's Chattahoochee .....	12.00	....	....
Swift's Atlanta Phos. and Potash .....	12.00	....	2.00
Swift's Corn and Cotton Fertilizer .....	11.00	2.47	2.00
Swift's Corn and Cotton Fertilizer .....	11.00	2.47	1.00
Swift's Fertilizer for Tobacco .....	10.00	2.47	3.00
Swift's Farmers Special .....	10.00	3.29	4.00
Swift's H. G. Guano .....	10.00	3.29	3.00
Swift's Prolific H. G. ....	10.00	2.47	6.00
Swift's Corn and Cotton Grower .....	10.00	2.47	3.00
Swift's Corn and Cotton Fertilizer .....	10.00	2.47	2.00
Swift's Climax .....	10.00	1.65	4.00
Swift's Eagle .....	10.00	1.65	2.00
Swift's Corn and Cotton Fertilizer .....	10.00	1.65	1.00
Swift's Planters Special .....	10.00	.82	3.00
Swift's Plow Boy .....	10.00	.82	1.00
Swift's Atlanta .....	10.00	....	5.00
Swift's Farmers Home .....	10.00	....	4.00
Swift's Field and Farm .....	10.00	....	2.00
Swift's Wheat Grower .....	10.00	....	2.00
Swift's Special .....	9.50	4.12	3.00
Swift's Blood, Bone and Potash .....	9.50	3.29	7.00
Swift's Champion .....	9.00	2.47	4.00
Swift's Special Cotton Grower .....	9.00	2.47	3.00
Swift's Cotton King .....	9.00	2.47	2.00
Swift's Special Cotton Guano .....	9.00	2.25	2.00
Swift's Gold Medal .....	9.00	1.65	3.00
Swift's Farmers Favorite .....	9.00	1.65	3.00
Swift's Cotton Plant .....	9.00	1.65	1.00
Swift's Special .....	9.00	.82	3.00
Swift's Special Formula .....	9.00	.82	2.00
Swift's C. S. M. Compound .....	8.00	3.29	2.00
Swift's Special S. G. G. ....	8.00	2.47	1.00
Swift's Special S. G. G. ....	8.00	2.47	2.00
Swift's Special .....	8.00	2.47	5.00
Swift's C. S. M. Compound .....	8.00	2.47	2.00
Swift's Cape Fear .....	8.00	4.12	3.00
Swift's Special Tobacco Grower .....	8.00	3.29	6.00
Swift's Majestic for Tobacco .....	8.00	3.29	4.00
Swift's Monarch .....	8.00	3.29	4.00
Swift's Cotton-seed Meal Compound .....	8.00	3.29	4.00
Swift's Quick Growth Tobacco Fertilizer....	8.00	3.29	2.00
Swift's Strawberry Grower .....	8.00	2.47	10.00
Piedmont Tobacco Grower .....	8.00	2.47	6.00
Carter's Prolific .....	8.00	2.47	4.00
Swift's Carolina Tobacco Grower .....	8.00	2.47	3.00
Swift's Plow Boy for Tobacco .....	8.00	2.47	3.00
Swift's Ruralist .....	8.00	2.47	3.00
Swift's C. S. M. Compound .....	8.00	2.47	3.00
Swift's Gold Leaf Tobacco Grower .....	8.00	2.05	3.00
Braswell's Formula .....	8.00	2.05	2.00
Sumatra Tobacco Grower .....	8.00	2.05	2.00
Swift's Bright Leaf Tobacco Grower .....	8.00	1.65	5.00
Swift's Pioneer Tobacco Grower .....	8.00	1.65	4.00
Swift's C. S. M. Compound .....	8.00	1.65	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Clark's Special Cotton Grower .....	8.00	1.65	3.00
Swift's Red Steer .....	8.00	1.65	2.00
Swift's Golden Harvest .....	8.00	1.65	2.00
Swift's Golden Harvest Tobacco Grower ....	8.00	1.65	2.00
Swift's Special .....	8.00	.82	6.00
Swift's Thompson's Special .....	8.00	.82	5.00
Swift's Golden Grain Grower .....	8.00	.82	4.00
Swift's Special Peanut Grower .....	8.00	.82	4.00
Swift's Plantation .....	8.00	....	4.00
Swift's C. S. M. Compound .....	8.00	1.65	2.00
Swift's Special .....	8.00	4.12	7.00
Swift's Carolina 7% Special Trucker .....	7.00	5.75	7.00
Swift's Special Irish Potato Grower .....	7.00	4.12	8.00
Swift's Potato Grower .....	7.00	4.12	7.00
Swift's Early Trucker .....	7.00	4.12	5.00
Swift's Special H. G. Guano .....	7.00	3.29	5.00
Swift's Special Tobacco Fertilizer .....	7.00	3.29	4.00
Swift's Special Tobacco Grower .....	7.00	4.13	5.00
Swift's C. S. M. Compound .....	6.00	3.29	4.00
Swift's C. S. M. Compound .....	6.00	2.47	3.00
Swift's Special .....	6.00	2.47	5.00
Swift's Special Trucker .....	6.00	4.12	7.00
Swift's Special Potato Grower .....	6.00	4.12	7.00
Swift's Favorite Trucker .....	6.00	4.92	6.00
Swift's Special H. G. Guano .....	6.00	4.12	5.00
Swift's Special Tobacco Grower .....	6.00	3.29	6.00
Swift's Special 16% Blood and Bone Trucker.	5.00	8.23	3.00
Swift's Superior Top Dresser .....	5.00	8.23	3.00
Swift's Plant Red Tobacco Fertilizer .....	5.00	6.56	2.00
Fruiter Top Dresser .....	5.00	4.92	2.50
Swift's No. 1 Ground Tankage .....	3.50	9.02	....
Swift's Special Top Dresser .....	4.00	8.23	4.00
Swift's Excelsior Top Dresser .....	4.00	6.15	2.00
Swift's Everett's Special Formula .....	4.00	3.29	3.00
Swift's Pure Nitrate of Soda .....	....	15.17	....
Swift's Ground Dried Blood .....	....	13.12	....
Swift's Special Top Dresser .....	....	8.23	4.00
Swift's Special Top Dresser .....	....	7.39	4.00
Swift's Nitrogen and Potash, No. 1 .....	....	7.39	3.00
Swift's Nitrogen and Potash, No. 2 .....	....	6.57	4.00
Swift's H. G. Top Dresser .....	....	7.39	3.00
Swift's H. G. Top Dresser .....	....	6.57	4.00
Swift's C. S. M. High Grade .....	....	6.16	....
Swift's Muriate of Potash .....	....	....	50.00
Swift's Sulphate of Potash .....	....	....	49.00
Swift's Pure German Kainit .....	....	....	12.00

*Southern Cotton Oil Company, Concord, Monroe  
Davidson, Gibson, Shelby, Wadcsboro.—*

L. H. P. ("Let's have plenty") .....	9.00	2.47	1.00
Standpat .....	9.00	1.65	1.00
Repeater .....	9.00	2.05	1.00
Clark's Special .....	8.00	1.65	3.00

*Tennessee Chemical Company, Greensboro,  
Chicago, and Wilmington.*

Raw Bone Meal.....Total	22.00	3.70	....
Ox Extra High Grade Acid Phosphate .....	17.00	....	....
Thomas Phosphate .....	17.00	....	....
Ox Tennessee High Grade Acid Phosphate...	16.00	....	....
Ox Acid Phosphate .....	15.00	....	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Ox High Grade Dissolved Bone .....	14.00	....	....
Ox 13-4 .....	13.00	....	4.00
Ox Special Acid Phosphate .....	13.00	....	....
Ox Alkaline Bone .....	12.00	....	2.00
Ox Acid Phosphate .....	12.00	....	....
Ox Bone and Potash .....	11.00	....	1.00
Ox High Grade Guano .....	10.00	3.30	4.00
Ox High Grade Fertilizer .....	10.00	2.47	3.00
Ox Monroe Special .....	10.00	2.05	4.00
Ox High Grade Ammoniated Bone .....	10.00	2.05	2.00
Ox Extra High Grade Guano .....	10.00	2.05	3.00
Ox Southern Guano .....	10.00	1.65	4.00
Ox Fish Compound .....	10.00	1.65	3.00
Ox Slaughter House Bone .....	10.00	1.65	2.00
Ox Special Crop Producer .....	10.00	.82	3.00
Ox Phosphate and Potash .....	10.00	....	3.00
Ox Bone and Potash .....	10.00	....	5.00
Ox Potash Formula .....	10.00	....	4.00
Ox Potash Mixture .....	10.00	....	2.00
Ox Fertilizer No. 1011.....	10.00	.82	1.00
Ox Cotton Guano .....	9.25	1.65	2.00
Ox Standard Fish Guano .....	9.25	1.65	2.00
Ox Standard Cotton Guano .....	9.25	1.65	2.00
Ox Cotton Grower .....	9.00	2.47	3.00
Ox Tobacco Grower .....	9.00	2.47	3.00
Ox Blood, Bone and Potash .....	9.00	1.65	3.00
Ox Fertilizer No. 913 .....	9.00	.82	3.00
Ox Fertilizer No. 913 .....	9.00	.82	3.00
Ox Fertilizer No. 92 $\frac{1}{4}$ -4 .....	9.00	1.85	4.00
Ox Standby .....	8.50	1.65	2.00
Ox Fertilizer No. 844 .....	8.00	3.30	4.00
Ox Special Compound Guano .....	8.00	2.47	3.00
Ox Surry County Tobacco Grower.....	8.00	2.47	3.00
Ox Tobacco Special .....	8.00	2.05	3.00
Ox Surry County Tobacco Special .....	8.00	2.05	3.00
Ox Surry County Tobacco Prize Winner ....	8.00	1.85	4.00
Ox Fertilizer No. 824 .....	8.00	1.65	4.00
Ox Fertilizer No. 822 .....	8.00	1.65	2.00
Ox Surry County Bright Tobacco Grower ...	8.00	1.65	2.00
Ox Fertilizer No. 813 .....	8.00	.82	3.00
Ox Blood and Bone .....	8.00	2.05	2.50
Ox Fertilizer No. 823 .....	8.00	1.65	3.00
Ox Fertilizer No. 835 .....	8.00	2.47	5.00
Ox Fertilizer No. 823 .....	8.00	1.65	3.00
Ox Potash Compound .....	8.00	....	4.00
Ox Fertilizer No. 755 .....	7.00	4.11	5.00
Ox Top Dresser .....	7.00	3.30	3.00
Ox Top Dresser .....	5.00	8.23	3.00
Ox Top Dresser .....	5.00	8.23	2.00
Ox Top Dresser .....	4.00	6.18	2.50
Ox Electric Top Dresser .....	2.00	8.23	3.00
Ox Top Dresser .....	....	7.81	4.00
Ox Top Dresser .....	....	7.40	3.00
Cotton-seed Meal .....	....	6.18	....
Tankage .....	....	8.23	....
Kainit .....	....	....	12.00
Sulphate of Potash .....	....	....	50.00
Muriate of Potash .....	....	....	50.00
Dried Blood .....	....	13.16	....
Nitrate of Soda .....	....	14.81	....

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Tidewater Guano Company, Norfolk, Va.—</i>			
Tidewater Guano Company Raw Bone Meal..	21.00	3.70	....
Top Rail Acid Phosphate .....	16.00	....	....
Buster Brown Acid Phosphate .....	14.00	....	....
J. W. S. Acid Phosphate .....	13.00	....	....
Tidewater 12-2 Bone and Potash .....	12.00	....	2.00
Bully Boy Dissolved Bone and Potash .....	10.00	....	2.00
Tidewater 1-9-3 Guano .....	9.00	.82	3.00
High Tide Soluble Guano .....	8.00	3.30	4.00
Sho Nuf Guano H. G. Compound Manure ...	8.00	2.47	3.00
B. B. Yellow Tobacco Grower .....	8.00	2.47	3.00
Good Money Complete Guano .....	8.00	1.00	4.00
Tidewater Special Tobacco Guano .....	8.00	2.06	3.00
Soil King Special Guano .....	8.00	1.85	4.00
Tidewater Soluble H. G. Guano .....	8.00	2.47	4.00
Hawk Eye Soluble Guano .....	8.00	2.06	2.00
Tidewater Truck Guano .....	7.00	4.12	5.00
Nitrate of Soda .....	....	14.85	....

*Tuscarora Fertilizer Company, Greensboro,  
Chicago, and Wilmington—*

Bone Meal .....	Total	24.00	2.47	....
Raw Bone Meal .....	Total	22.00	3.70	....
Tuscarora Acid Phosphate .....		17.00	....	....
Thomas Phosphate .....	Total	17.00	....	....
Tuscarora Acid Phosphate .....		16.00	....	....
Tuscarora Acid Phosphate .....		14.00	....	....
Tuscarora Acid Phosphate .....		13.00	....	....
Fertilizer No. 1244 .....		12.00	3.30	4.00
Bone and Potash .....		12.00	....	4.00
Phosphate and Potash .....		12.00	....	6.00
Bone and Potash .....		12.00	....	5.00
Bone and Potash .....		12.00	....	2.00
Tuscarora Acid Phosphate .....		12.00	....	....
Sampson's Corn Mixture .....		11.00	....	5.00
Bone and Potash .....		11.00	....	1.00
Fertilizer No. 1044 .....		10.00	3.30	4.00
Fertilizer No. 1033 .....		10.00	2.47	3.00
Fertilizer No. 1025 .....		10.00	1.65	5.00
Fertilizer No. 1023 .....		10.00	1.65	3.00
Fertilizer No. 1022 .....		10.00	1.65	2.00
Tuscarora Special Guano .....		10.00	.82	3.00
Phosphate and Potash .....		10.00	....	6.00
Alkaline Bone .....		10.00	....	5.00
Acid and Potash .....		10.00	....	4.00
Bone and Potash .....		10.00	....	2.00
Tuscarora Golden Grain Grower .....		10.00	....	2.00
Fertilizer, No. 1011 .....		10.00	.82	1.00
Bone and Potash .....		10.00	....	3.00
Fertilizer No. 933 .....		9.00	2.47	3.00
Tobacco Fertilizer .....		9.00	2.47	3.00
Fertilizer No. 924 <sup>5</sup> .....		9.00	2.05	5.00
Fertilizer No. 924 <sup>3</sup> .....		9.00	2.05	3.00
Fertilizer No. 924 .....		9.00	1.65	4.00
Tuscarora Chief .....		9.00	1.65	3.00
Fertilizer No. 913 .....		9.00	.82	3.00
Fertilizer No. 912 .....		9.00	.82	2.00
Fertilizer No. 923 <sup>1</sup> 2 .....		9.00	2.26	2.00
Bone and Potash .....		9.00	....	3.00
Standard Cotton Grower .....		8.50	1.65	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Tuscarora Trucker .....	8.00	4.11	7.00
Fertilizer No. 846 .....	8.00	3.30	6.00
Fertilizer No. 845 .....	8.00	3.30	5.00
Fertilizer No. 844 .....	8.00	3.30	4.00
Tuscarora Tobacco Grower .....	8.00	3.30	4.00
Fertilizer No. 8310 .....	8.00	2.47	10.00
Fertilizer No. 836 .....	8.00	2.47	6.00
Fertilizer No. 835 .....	8.00	2.47	5.00
Special for Tobacco .....	8.00	2.47	5.00
Boone's Special .....	8.00	2.47	4.00
Tobacco Special .....	8.00	2.47	3.00
Cotton Special .....	8.00	2.47	3.00
Tuscarora Blood and Bone .....	8.00	2.47	3.00
Tuscarora Tobacco Fertilizer .....	8.00	2.05	3.00
Good Enough .....	8.00	2.05	3.00
Tuscarora Champion .....	8.00	2.05	2.50
Tuscarora Champion Tobacco Grower .....	8.00	2.05	2.50
Snow's Tobacco Special .....	8.00	1.85	4.00
High Grade Trucker .....	8.00	1.65	10.00
Fertilizer No. 825 .....	8.00	1.65	5.00
Fertilizer No. 824 .....	8.00	1.65	4.00
Fertilizer No. 823 .....	8.00	1.65	3.00
Tuscarora Standard .....	8.00	1.65	2.00
Tuscarora Standard Tobacco Grower .....	8.00	1.65	2.00
Fertilizer No. 815 .....	8.00	.82	5.00
Fertilizer No. 814 .....	8.00	.82	4.00
Fertilizer No. 813 .....	8.00	.82	3.00
Fertilizer No. 82 $\frac{1}{4}$ 3 .....	8.00	1.85	3.00
Bone and Potash .....	8.00	....	5.00
Bone and Potash .....	8.00	....	4.00
Fertilizer, No. 832 .....	8.00	2.47	2.00
Fertilizer No. 755 .....	7.00	4.11	5.00
5% Trucker .....	6.00	4.11	7.00
Fertilizer No. 646 .....	6.00	3.30	6.00
Manure Substitute .....	6.00	3.30	4.00
Fertilizer No. 637 .....	6.00	2.47	7.00
Complete Top Dresser .....	4.00	6.18	2.50
Tuscarora Top Dresser .....	....	7.81	4.00
Tuscarora Chief Top Dresser .....	....	7.40	3.00
Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00
Nitrate of Soda .....	....	14.81	....
Dried Blood .....	....	13.16	....
Tankage .....	....	8.23	....
Cotton Seed Meal .....	....	6.18	....
Sulphate of Ammonia .....	....	20.00	....

*The Trakman Manufacturing Co., Inc., Church-*  
*land, Va.—*

Trakman's 5% Guano .....	6.00	4.12	5.00
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*L. J. Upton & Co., Inc., Norfolk, Va.—*

Upton's Special Fertilizer .....	7.00	4.11	5.00
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*R. L. Upshur Guano Co., Norfolk, Va.—*

Upshur's 16% Acid Phosphate .....	16.00	....	....
Upshur's 14% Acid Phosphate .....	14.00	....	....
Upshur's 10-4 Bone and Potash .....	10.00	....	4.00
Upshur's 10-2 Bone and Potash .....	10.00	....	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Upshur's Spinach Special .....	9.00	5.76	2.00
Upshur's C. S. M. Mixture .....	9.00	2.26	2.00
Upshur's Special 8-4-4 .....	8.00	3.29	4.00
Upshur's 8-3-3 Cotton Guano .....	8.00	2.47	3.00
Upshur's High Grade Tobacco Guano .....	8.00	2.47	3.00
Upshur's O. P. (Old Plantation) .....	8.00	2.06	3.00
Upshur's Fish, Bone and Potash .....	8.00	1.65	4.00
Upshur's Peanut Guano .....	8.00	1.03	4.00
Upshur's Premo Cotton Guano .....	8.00	1.65	2.00
Upshur's 8-3-3 Guano .....	8.00	2.47	3.00
Upshur's Special Truck Guano .....	7.00	4.11	8.00
Upshur's F. F. (Farmer's Favorite) .....	7.00	4.11	6.00
Upshur's 5% Guano .....	7.00	4.11	5.00
Upshur's 7% Special Potato Guano .....	6.00	5.76	5.00
Upshur's Special Formula .....	6.00	5.76	3.00
Upshur's Norfolk Special 10% .....	5.00	8.23	2.00
Upshur's Top Dresser .....	3.00	8.23	4.00
Upshur's Genuine German Kainit .....	....	....	12.00
Nitrate of Soda .....	....	15.65	....
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00

*Union Guano Co., Winston-Salem, N. C.—*

Union Concentrated Acid Phosphate .....	24.00	....	....
Pure Raw Animal Bone Meal .....	20.60	3.71	....
Union Concentrated Acid with Potash .....	18.00	....	2.00
Union Brand Ground Slag.....Total P. A.	17.00	....	....
Union 16% Acid Phosphate .....	16.00	....	....
Union H. G. Acid Phosphate .....	14.00	....	....
Dissolved Animal Bone Meal .....	13.00	2.06	....
Union Dissolved Bone .....	13.00	....	....
Union 12-6 Bone and Potash .....	12.00	....	6.00
Union 12-5 Bone and Botash .....	12.00	....	5.00
Union 12-4 Bone and Potash .....	12.00	....	4.00
Union 12-3 Bone and Potash .....	12.00	....	3.00
Union 12-2 Bone and Potash .....	12.00	....	2.00
Union 12% Acid Phosphate .....	12.00	....	....
Liberty Bell Crop Grower .....	10.50	....	1.50
Union Prolific Cotton Compound .....	10.00	3.29	4.00
Union Special Formula for Cotton .....	10.00	2.47	3.00
Union Mule Brand Guano .....	10.00	1.65	2.00
Grain Chemicals .....	10.00	1.03	6.00
Union 10-6 Bone and Potash .....	10.00	....	6.00
Union 10-5 Bone and Potash .....	10.00	....	5.00
Union 10-4 Bone and Potash .....	10.00	....	4.00
Quaker Grain Mixture .....	10.00	....	4.00
Giant Phosphate and Potash .....	10.00	....	3.00
Finch & Harris Special Bone and Potash Mixture .....	10.00	....	3.00
Union Bone and Potash .....	10.00	....	2.00
Union Gold Leaf Tobacco Mixture .....	9.00	2.47	6.00
Union Renown Guano .....	9.00	2.47	3.00
Union Perfect Cotton Grower .....	9.00	2.26	2.00
Union Complete Cotton Mixture .....	9.00	1.65	3.00
Farmers Blood and Bone Guano .....	9.00	1.65	3.00
Dixie Cotton Grower .....	9.00	1.65	2.00
Q. & Q. (Quality and Quantity) Guano .....	9.00	1.65	1.00
B. S. Ammoniated Guano .....	9.00	.82	3.00
Carolina Grain Grower .....	9.00	.82	2.00
Georgia Golden Grain Grower .....	8.00	.82	3.00
Union Guano for Tobacco .....	8.00	3.29	6.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Union Premium Guano .....	8.00	3.29	4.00
Union Homestead Guano .....	8.00	2.47	3.00
Victoria High Grade Tobacco Fertilizer ....	8.00	2.47	3.00
Bright Leaf Tobacco Compound .....	8.00	2.26	7.00
Union Waterfowl Guano .....	8.00	2.06	3.00
Union Standard Tobacco Grower .....	8.00	2.06	2.00
Union Potato Mixture .....	8.00	1.65	10.00
Old Honesty Guano .....	8.00	1.65	2.00
Fish Brand Ammoniated Guano for Tobacco	8.00	1.65	2.00
Old Honesty Tobacco Guano .....	8.00	1.65	2.00
Fish Brand Ammoniated Guano .....	8.00	.82	4.00
Union Superlative Guano .....	8.00	.82	3.00
Sunrise Ammoniated Guano .....	8.00	....	5.00
Union 8-5 Bone and Potash .....	8.00	....	4.00
Union Wheat Mixture .....	7.00	4.12	8.00
Union Vegetable Compound .....	7.00	4.12	8.00
Sandy Land Bright Tobacco Grower .....	7.00	3.29	5.00
Union Truck Guano .....	4.00	6.18	4.00
Complete Mixture for Top Dressing .....	2.00	8.24	2.50
Special 10% Top Dresser .....	....	14.82	....
Nitrate of Soda .....	....	....	....
Union Top Dresser Ammoniated and Potash Mixture .....	....	7.42	3.00
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Genuine German Kainit .....	....	....	12.00
Cotton Seed Meal .....	....	6.19	....

*Union Seed and Fertilizer Co., Wilmington, Charlotte and Henderson.—*

High Grade Acid Phosphate .....	16.00	....	....
Bone and Potash .....	10.00	....	4.00
Cockrell-Williams Cotton Grower .....	9.00	2.27	2.00
U. S. & F. Cotton Grower .....	9.00	1.65	1.00
Wilmington U. S. & F. ....	9.00	2.47	1.00
Wilmington Truck Grower .....	8.00	3.30	4.00
Wilmington High Grade .....	8.00	2.47	3.00
Wilmington Tobacco Grower .....	8.00	3.30	4.00
Wilmington Farmer Boy .....	8.00	2.47	4.00
Wilmington Cotton Grower .....	8.00	1.65	2.00
Best Tobacco Grower .....	8.00	2.47	7.57
Wilmington Mortgage Lifter .....	9.00	2.27	2.00
Wilmington Special .....	8.00	1.65	2.00
L. P. B. Special .....	8.00	2.47	3.00
Wilmington High Grade .....	8.00	2.47	3.00
Wilmington Truck Grower .....	8.00	3.30	4.00
Cockrell-Williams Cotton Grower .....	8.00	2.27	2.00
Lewis Special .....	8.00	2.47	3.00
John's Special .....	8.00	2.47	4.00
Wilmington Full Value .....	8.00	3.30	4.00
Wilmington Leader .....	8.00	2.47	3.00
Wilmington Fruit Grower .....	8.00	2.47	10.00
Wilmington Pride .....	8.00	4.11	7.00
Raleigh Standard Guano .....	8.00	2.26	2.00
Raleigh Special Guano .....	8.00	2.47	3.00
Best Tobacco Grower .....	8.00	2.47	7.50
Wilmington Banner .....	8.00	1.65	3.00
Wilmington Leader .....	8.00	2.47	3.00
U. S. & F. Special .....	8.00	2.47	2.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash
Wilmington Standard .....	8.00	2.47	2.50
Wilmington Great Grower .....	8.00	2.05	2.00
Wilmington Headlight .....	6.00	3.30	8.00
Wilmington H. G. Top Dresser .....	4.50	7.40	3.00
Nitrate of Soda .....	....	14.76	....
Dried Blood .....	....	13.12	....
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	48.00
Kainit .....	....	....	12.00
Cotton Seed Meal .....	....	7.50	1.15
Dried Blood .....	....	13.12	....
Wilmington Special Top Dresser .....	....	7.40	3.00

*United States Fertilizer Co., Baltimore, Md.—*

Acid Phosphate .....	16.00	....	....
Special Mixture, W. F. Marsh, Jr. ....	10.00	2.47	3.00
Pride of Vance Tobacco Fertilizer .....	9.00	2.47	3.00
Henderson Tobacco Fertilizer .....	9.00	2.47	3.00
Franklin Tobacco Fertilizer .....	9.00	2.47	3.00
Unedit Tobacco Fertilizer .....	9.00	2.47	3.00
Farm Bell Excelsior Guano .....	8.00	3.28	7.00
Farm Bell Majestic Guano .....	8.00	3.28	4.00
Farm Bell Animal Ammoniated .....	8.00	1.65	5.00
Sul-Pot Brand Tobacco Guano .....	8.00	2.47	3.00
Vance Cotton Grower .....	8.00	1.65	2.00
Henderson Cotton Grower .....	8.00	1.65	2.00
Franklin Cotton Grower .....	8.00	1.65	2.00
Unedit Cotton Grower .....	8.00	1.65	2.00
Henderson Standard Guano .....	8.00	2.26	2.00
Brewer's Special .....	8.00	2.26	2.00
American Pet .....	8.00	2.26	2.00
McKinne Mixture .....	8.00	2.26	3.25
Henderson High Grade .....	8.00	2.47	3.00
Two in One .....	8.00	3.29	4.00
Currin's Special for Tobacco .....	8.00	3.29	4.00
Kainit .....	....	....	12.00
Nitrate of Soda .....	....	14.80	....

*Venable Fertilizer Co., Richmond, Va.—*

Pure Animal Bone .....	Total	25.00	2.47	....
Pure Raw Bone Meal .....	Total	22.50	3.70	....
Venable's Best Acid Phosphate .....		16.00	....	....
High Grade Acid Phosphate .....		14.00	....	....
Bone and Potash Mixture .....		14.00	....	2.00
Venable's Dissolved Bone .....		13.00	....	....
Venable's Standard Acid Phosphate .....		12.00	....	....
Venable's Corn Special Fertilizer .....		12.00	1.00	2.00
Venable's Majestic Bone and Potash .....		12.00	....	5.00
Venable's Corn, Wheat and Grass Fertilizer		10.00	.82	1.00
High Grade Bone and Potash Mixture .....		10.00	....	4.00
Bone and Potash Mixture .....		10.00	....	2.00
Venable's Majestic Guano .....		9.00	1.65	3.00
Venable's B. B. P. Manure .....		9.00	1.65	1.00
Venable's Wheat Grower .....		9.00	.82	2.00
Majestic Grain Guano .....		9.00	.82	3.00
Venable's 3-9-3 Tobacco Fertilizer .....		9.00	2.47	3.00
Roanoke Meal Mixture .....		9.00	2.26	2.00
Roanoke Mixture .....		9.00	2.26	2.00
Venable's Carolina Favorite .....		9.00	2.47	6.00
Venable's Meal Mixture .....		8.00	1.65	2.00
Planter's Bone Fertilizer .....		8.00	1.65	2.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Venable's Ideal Manure .....	8.00	1.65	5.00
Farmer's Union Special Tobacco Fertilizer..	8.00	1.65	2.00
Venable's Alliance Tobacco Manure, No. 2...	8.00	1.65	2.00
Venable's Peanut Special .....	8.00	.82	4.00
Venable's Grain Special .....	8.00	.82	4.00
Venable's Alliance Bone and Potash Mixture	8.00	....	4.00
Venable's Peanut Grower .....	8.00	....	4.00
Venable's 5% Trucker .....	8.00	4.11	5.00
Venable's 4% Trucker .....	8.00	3.29	4.00
Venable's Sovereign Guano .....	8.00	3.29	4.00
Venable's Special Tobacco Fertilizer .....	8.00	3.29	6.00
Venable's Choice Fertilizer .....	8.00	2.47	3.00
Venable's H. G. Tobacco Fertilizer .....	8.00	2.47	3.00
Venable's High Grade Cotton Grower .....	8.00	2.47	3.00
Farmer's Union H. G. Tobacco Guano .....	8.00	2.47	3.00
Venable's Roanoke Special .....	8.00	2.06	3.00
Venable's Alliance Tobacco Manure, No. 1..	8.00	2.06	3.00
Venable's Cotton Grower .....	8.00	2.06	3.00
Our Union Tobacco Fertilizer .....	8.00	1.65	4.00
Our Union Special Fertilizer .....	8.00	1.65	2.00
Venable's 10% Top Dresser .....	6.00	8.23	2.00
Venable's 6-6-6 Manure .....	6.00	4.94	6.00
Venable's Top Dresser .....	4.00	8.23	4.00
Majestic Top Dresser .....	4.00	6.17	2.50
High Grade German Potash .....	....	....	16.00
Pure German Kainit .....	....	....	12.00
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	48.00
Nitrate of Soda .....	....	14.80	....
Sulphate of Ammonia .....	....	19.75	....
Special Top Dresser .....	....	7.40	3.00

*Vance Guano Co., Henderson, N. C.—*

Vance Corn and Grain Grower .....	10.00	1.00	3.50
Farmer's Union .....	9.00	3.00	3.00
Brodie's Best .....	8.00	4.00	4.00
Vance Tobacco Special .....	8.00	3.00	8.00
Fish Brand .....	8.00	3.00	3.00
Hot Stuff for Cotton .....	8.00	2.00	2.00
Sterling Cotton Grower .....	8.00	2.00	2.00
Vance Top Dresser .....	3.00	10.00	5.00

*Jas. L. Vance & Co., Inc., Chilhowie, Va.—*

Raw Bone Meal .....	21.00	4.93	....
16% Acid Phosphate .....	16.00	....	....
15-2 Potash Mixture .....	15.00	....	2.00
12-2 Potash Mixture .....	12.00	....	2.00
Bone Meal Mixture .....	12.00	1.65	3.00
10-2 Potash Mixture .....	10.00	....	2.00
Grain and Grass .....	10.00	1.65	2.00
Truck Grower .....	10.00	2.47	3.00
Corn Grower .....	9.00	1.00	2.00
Potato and Truck Special .....	9.00	4.12	3.00
Tankage and Potash Mixture .....	8.00	1.65	2.00
Top Dresser .....	8.00	3.29	1.00
Cabbage and Tobacco .....	8.00	1.65	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
<i>Virginia-Carolina Chemical Co., Richmond, Va.—</i>			
Fulton Acid Phosphate .....	14.00	....	....
I. X. L. Acid Phosphate .....	13.00	....	....
Standard Acid Phosphate .....	12.00	....	....
Rocketts Acid Phosphate .....	12.00	....	....
B. P. Potash Mixture .....	10.00	....	2.00
McGavock's Special Potash Mixture .....	10.00	....	2.00
Star Brand Special Tobacco Manure .....	9.00	2.26	2.00
Star Brand Special Tobacco Manure .....	9.00	2.26	2.00
Star Brand Special High Grade .....	9.00	2.06	5.00
Star Brand Guano .....	9.00	1.65	1.00
Little Giant Grain and Grass Grower .....	9.00	.82	2.00
Anchor Brand Tobacco Fertilizer .....	8.50	2.26	2.00
Star Brand Vegetable Guano .....	8.00	3.71	4.00
A. A. Guano .....	8.00	2.47	3.00
Anchor Brand Fertilizer .....	8.00	1.65	2.00
Old Hickory Guano .....	8.00	1.65	2.00
Peanut Grower .....	8.00	1.00	4.00
Eureka Acid Phosphate .....	16.00	....	....
Valley of Virginia Phosphate .....	14.00	....	....
Crenshaw's Acid Phosphate .....	13.00	....	....
Our Acid Phosphate .....	12.00	....	....
Eureka Bone and Potash Compound .....	10.00	....	2.00
Eureka Ammoniated Bone Special for Tobacco	9.00	2.06	2.00
Orient Complete Manure .....	9.00	1.65	2.00
Virginia Trucker .....	8.00	4.12	5.00
Eureka Ammoniated Bone .....	8.00	1.65	2.00
Orient Special for Tobacco .....	8.00	1.65	2.00
Carolina Truckers .....	7.00	5.76	7.00
V.-C. C. Co.'s Sweepo Special .....	6.00	1.65	5.00
V.-C. C. Co.'s Titan Truck Fertilizer .....	7.00	4.12	6.00
V.-C. C. Co.'s Potash Special for Sweet Potatoes	8.00	3.29	5.00
V.-C. C. Co.'s 5% Tobacco Guano .....	8.00	2.47	5.00
V.-C. C. Co.'s Wheeler's Special Guano.....	8.00	3.29	2.00
Peanut Grower .....	8.00	1.00	4.00
15% Acid Phosphate .....	15.00	....	....
Catawba Acid Phosphate .....	14.00	....	....
Acid Phosphate .....	13.00	....	....
Dayvault's Special .....	12.00	....	6.00
Dissolved Bone .....	12.00	....	....
Oliver's Perfect Wheat Grower .....	11.00	2.47	4.00
Ten two Bone and Potash .....	10.00	....	2.00
High Grade Special Tobacco Fertilizer .....	9.00	2.06	2.00
Queen of the Harvest C. S. M. ....	9.00	1.65	2.00
McCrary's Diamond Bone and Potash .....	9.00	....	3.00
Groom's Special Tobacco Fertilizer .....	8.00	2.47	4.00
Catawba Guano B. G. ....	8.00	2.47	3.00
Special 3% Guano C. S. M. ....	8.00	2.47	2.00
Ammoniated Guano B. G. ....	8.00	2.06	1.50
Ammoniated Guano C. S. M. ....	8.00	2.06	1.50
The Leader B. G. ....	8.00	1.65	2.00
King Cotton Grower .....	8.00	1.65	2.00
Owl Brand H. G. Acid Phosphate .....	16.00	....	....
Owl Brand H. G. Dissolved Bone .....	14.00	....	....
Owl Brand Acid Phosphate .....	13.00	....	....
Owl Brand Dissolved Bone .....	12.00	....	....
Owl Brand Acid Phosphate with Potash ...	10.00	....	2.00
Owl Brand H. G. 3% Soluble Guano .....	9.00	2.06	3.00
Owl Brand Special Tobacco Guano .....	9.00	2.06	2.00
Owl Brand Truck Guano .....	8.00	4.94	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Owl Brand Guano for Tobacco .....	8.00	2.47	3.00
Vinco Guano .....	8.00	1.65	3.00
Owl Brand Guano .....	8.00	1.65	2.00
Peanut Grower .....	8.00	1.00	4.00
Best Acid Phosphate .....	16.00	....	....
Standard H. G. Acid Phosphate .....	14.00	....	....
Excelsior Dissolved Bone .....	14.00	....	....
Blacksburg Dissolved Bone .....	13.00	....	....
N. C. Farmers' Alliance Official Acid Phosphate .....	13.00.	....	....
Double Bone Phosphate .....	13.00	....	....
Acid Phosphate .....	12.00	....	....
Great Wheat and Corn Grower .....	10.50	....	1.50
Diamond Wheat Mixture .....	10.00	....	3.00
Standard Wheat and Corn Grower .....	10.00	....	2.00
Blue Ridge Wheat Grower .....	10.00	....	2.00
Standard Wheat Grower .....	10.00	....	2.00
Bone and Potash Mixture .....	10.00	....	2.00
L. & M. Special .....	9.00	2.47	2.00
Standard Guano .....	9.00	1.65	2.00
Ammoniated Fertilizer .....	9.00	1.65	1.00
Special Plant and Truck Fertilizer .....	8.00	4.12	3.00
Durham High Grade .....	8.00	3.29	4.00
Gold Medal Brand .....	8.00	2.47	3.00
Yellow Leaf Tobacco Guano .....	8.00	2.47	3.00
N. C. Farmers' Alliance Official .....	8.00	2.06	3.00
Pride of Durham Tobacco Grower .....	8.00	2.06	3.00
Raw Bone Super Phosphate for Tobacco ....	8.00	2.06	2.00
Raw Bone Super Phosphate .....	8.00	2.06	1.50
Genuine Bone and Peruvian Guano .....	8.00	1.65	2.00
Genuine Bone and Peruvian Guano for Tobacco .....	8.00	1.65	2.00
Blacksburg Soluble Guano .....	8.00	1.65	2.00
Progressive Farmer Guano .....	8.00	1.65	2.00
Carr's Special Wheat Grower .....	8.00	....	4.00
Best Potato Manure .....	7.00	5.76	7.00
Peanut Grower .....	8.00	1.00	4.00
Ironside Acid Phosphate .....	16.00	....	....
High Grade Acid Phosphate .....	14.00	....	....
Arvonla Acid Phosphate .....	13.00	....	....
Spartan Acid Phosphate .....	12.00	....	....
Alpine Mixture .....	10.00	....	5.00
S. W. Special Bone and Potash Mixture ....	10.00	....	4.00
Dissolved Bone and Potash .....	10.00	....	2.00
Independent Standard .....	8.50	1.65	2.00
Bright Belt Guano .....	8.00	2.47	3.00
Solid Gold Tobacco Guano .....	8.00	2.26	4.00
New Era .....	8.00	1.65	3.00
Lynchburg Soluble .....	8.00	1.65	2.00
Lynchburg Soluble for Tobacco .....	8.00	1.65	2.00
Norfolk Reliable Acid Phosphate .....	14.00	....	....
Norfolk Best Acid Phosphate .....	13.00	....	....
Norfolk Soluble Bone .....	12.00	....	....
Norfolk Bone and Potash .....	10.00	....	2.00
Norfolk Truck and Tomato Grower .....	8.00	4.12	5.00
Amazon High Grade Manure .....	8.00	2.47	3.00
Amazon Special H. G. Tobacco Guano .....	8.00	2.47	3.00
Cooper's Bright Tobacco Fertilizer .....	8.00	2.06	3.00
Genuine Slaughter House Bone Guano, made expressly for tobacco .....	8.00	2.06	2.00
Peanut Grower .....	8.00	1.00	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Crescent Brand Ammoniated Fertilizer .....	8.00	1.65	2.00
Genuine Slaughter House Bone Guano .....	8.00	1.65	2.00
Bright Leaf Tobacco Grower .....	8.00	2.47	3.00
High Grade Acid Phosphate .....	14.00	....	....
Bone Phosphate .....	13.00	....	....
Royster's Acid Phosphate .....	12.00	....	....
Obelisk Brand Bone and Potash .....	10.00	....	4.00
Planter's Bone and Potash Mixture .....	10.00	....	3.00
Alkaline Bone and Potash .....	10.00	....	2.00
Horne's Cotton Fertilizer .....	9.00	2.06	3.00
Standard Raw Bone Soluble Guano .....	9.00	1.65	1.00
Farmers' Friend H. G. Fertilizer .....	8.00	2.47	3.00
Farmers' Friend Special Tobacco Fertilizer.	8.00	2.47	3.00
Osceola Tobacco Guano .....	8.00	2.06	3.00
Farmers' Friend Fertilizer .....	8.00	1.65	2.00
Special Wheat Guano .....	8.00	1.65	2.00
Soluble Tobacco Guano .....	8.00	1.65	2.00
Bullock's Cotton Guano .....	8.00	1.65	2.00
Miller's Special Wheat Mixture .....	8.00	....	4.00
7-7-7 Truck Guano .....	7.00	5.76	7.00
Potato Manure .....	7.00	4.12	8.00
7% Truck Fertilizer .....	6.00	5.76	6.00
6-7-5 Truck Guano .....	6.00	5.76	5.00
Special Sweet Potato Guano .....	6.00	1.65	6.00
10% Truck Fertilizer .....	5.00	8.24	2.50
Soluble Guano .....	8.00	1.65	2.00
Farmers' Soluble Bone H. G. Special Tobacco Manure .....	8.00	2.47	3.00
Peanut Grower .....	8.00	1.00	4.00
Almont H. G. Acid Phosphate .....	14.00	....	....
Fulps Acid Phosphate .....	13.00	....	....
Cotton Brand Acid Phosphate .....	13.00	....	....
Almont Acid Phosphate .....	12.00	....	....
Cotton Brand Acid Phosphate .....	12.00	....	....
Almont Acid Phosphate and Potash .....	10.50	....	1.50
Almont Wheat Mixture .....	10.00	....	3.00
Dissolved Bone and Potash .....	10.00	....	2.00
C. S. M. Standard Guano .....	9.00	2.47	2.00
Truck Farmers Special Ammoniated Guano..	8.00	3.29	5.00
Cotton Brand Ammoniated Dissolved Bone..	8.00	3.29	4.00
Old Kentucky H. G. Tobacco Manure .....	8.00	2.47	3.00
Cotton Belt Ammoniated Guano .....	8.00	2.47	2.00
Carolina Golden Belt Ammoniated Guano for Tobacco .....	8.00	2.06	3.00
Powers Ammoniated Guano .....	8.00	2.06	2.00
Gibbs Ammoniated Guano .....	8.00	2.06	1.50
Almont Soluble Ammoniated Guano .....	8.00	1.65	2.00
C. S. M. Soluble Ammoniated Guano .....	8.00	1.65	2.00
Eagle Island Ammoniated Guano .....	8.00	1.65	2.00
Peanut Grower .....	8.00	1.00	4.00
Comet 16% Acid Phosphate .....	16.00	....	....
Clicks 16% Acid Phosphate .....	16.00	....	....
Red Cross 14% Acid Phosphate .....	14.00	....	....
Victor Acid Phosphate .....	13.00	....	....
Chatham Acid Phosphate .....	13.00	....	....
Reaper Grain Application .....	12.00	....	3.00
Tar Heel Acid Phosphate .....	12.00	....	....
Horse Shoe Acid Phosphate .....	12.00	....	....
Quickstep Bone and Potash .....	11.00	....	5.00
Solid South .....	10.00	....	6.00
Winner Grain Mixture .....	10.00	....	4.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Farmers' Pride Bone and Potash .....	10.00	....	3.00
Winston Bone and Potash .....	10.00	....	2.00
Mammoth Corn Grower .....	10.00	....	2.00
Mammoth Wheat and Grass Grower .....	10.00	....	2.00
Sun Brand Guano .....	9.00	2.06	5.00
Geo. Washington Plant Bed for Tobacco .....	8.00	2.47	2.50
Geo. Washington Plant Bed for Tobacco .....	8.00	2.47	2.50
Pilot Ammoniated Guano Special for Tobacco .....	8.00	2.06	3.00
Electric Tobacco Guano .....	8.00	1.65	2.00
Electric Standard Guano .....	8.00	1.65	2.00
Yadkin Complete Fertilizer .....	8.00	1.65	2.00
Clicks Special Wheat Compound .....	8.00	....	4.00
Powhatan Acid Phosphate .....	14.00	....	....
Dissolved S. C. Bone .....	13.00	....	....
Stonewall Brand Acid Phosphate .....	12.00	....	....
Bone and Potash Mixture .....	10.00	....	2.00
Tobacco Fertilizer .....	8.00	3.29	2.50
Richmond Brand Guano .....	8.00	2.47	3.00
Peanut Grower .....	8.00	1.00	4.00
Killinkinnick Tobacco Mixture .....	8.00	2.06	3.00
Lee Brand Guano .....	8.00	1.65	2.00
Stonewall Guano .....	8.00	1.65	2.00
Stonewall Tobacco Guano .....	8.00	1.65	2.00
Special Irish Potato Guano .....	6.00	5.76	6.00
7% Ammoniated Guano for Truck .....	6.00	5.76	6.00
Irish Potato Guano .....	6.00	4.94	6.00
Strawberry Grower .....	6.00	3.29	4.00
Top Dresser .....	5.00	9.06	....
10% Truck Guano .....	5.00	8.24	2.50
Appemattox Standard Tobacco Grower .....	8.00	1.65	2.00
Powhatan Tobacco Fertilizer .....	9.00	2.47	3.00
Peruvian H. G. Tobacco Guano .....	8.00	2.47	3.00
Champion Acid Phosphate .....	16.00	....	....
Dissolved Bone Phosphate .....	14.00	....	....
Standard Dissolved S. C. Bone .....	13.00	....	....
Capital Dissolved Bone .....	12.00	....	....
Capital Bone and Potash Compound .....	10.00	....	2.00
Capital Truck Fertilizer .....	8.00	3.29	3.00
Capital Tobacco Fertilizer .....	8.00	3.29	3.00
Big Leaf Tobacco Grower .....	8.00	2.47	3.00
Capital Cotton Fertilizer .....	8.00	2.06	2.00
National Fertilizer .....	8.00	1.65	2.00
National Special Tobacco Fertilizer .....	8.00	1.65	2.00
Beef, Blood and Bone Fertilizer .....	8.00	1.00	4.00
Peanut Grower .....	8.00	....	4.00
Special Wheat Compound .....	8.00	....	4.00
7% Truck Fertilizer .....	6.00	5.76	5.00
National Tobacco Fertilizer .....	8.50	1.85	2.25
Bull Run Acid Phosphate .....	16.00	....	....
Gilt Edge Brand Acid Phosphate .....	14.00	....	....
Clipper Brand Acid Phosphate .....	13.00	....	....
Lurich Acid Phosphate .....	12.00	....	....
Alps Brand Acid Phosphate .....	12.00	....	....
Mountain Top Bone and Potash .....	10.00	....	5.00
XX Potash Mixture .....	10.00	....	4.00
Dissolved Bone and Potash .....	10.00	....	2.00
No. 1 Soluble Guano .....	9.00	1.65	2.00
Highland King .....	9.00	1.65	1.00
Game Cock Special Tobacco .....	8.50	1.65	2.00
High Grade Tobacco Guano .....	8.00	2.47	3.00
Bull Dog Soluble Guano .....	8.00	2.47	3.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Dunnington's Special Formula for Tobacco ..	8.00	2.47	3.00
Peerless Special Tobacco Guano .....	8.00	2.47	3.00
Buffalo Guano .....	8.00	2.06	3.00
Austrian Tobacco Grower .....	8.00	2.06	2.00
Gilt Edge Special Tobacco Guano .....	8.00	2.06	2.00
Virginia State Guano .....	8.00	1.65	2.00
Battle Axe Tobacco Guano .....	8.00	1.65	2.00
Gilt Edge Brand Dissolved Bone and Potash	8.00	....	4.00
17% Acid Phosphate .....	17.00	....	....
16% Acid Phosphate .....	16.00	....	....
14% Acid Phosphate .....	14.00	....	....
Special H. G. Potash Mixture .....	12.00	....	6.00
12-4 Grain Grower .....	12.00	....	4.00
High Grade Potash Mixture .....	12.00	....	5.00
Special Crop Grower .....	12.00	....	3.00
Grain Special .....	10.00	....	6.00
Standard Bone and Potash .....	10.00	....	5.00
Special Potash Mixture .....	10.00	....	4.00
Dissolved Bone and Potash .....	10.00	....	2.00
Vececo Cotton Grower C. S. M. ....	9.00	2.26	2.00
Cotton Grower .....	9.00	2.26	2.00
Farmers' Choice .....	8.00	3.29	4.00
Special .....	8.00	3.29	4.00
H. G. Tobacco Fertilizer .....	8.00	2.47	10.00
Monarch Brand .....	8.00	1.65	5.00
Corn and Peanut Special .....	8.00	1.65	4.00
Special Peanut Grower .....	8.00	1.00	4.00
Peanut Grower .....	8.00	.82	4.00
Potash Mixture for Peanuts .....	8.00	....	4.00
Konqueror H. G. Truck Fertilizer .....	7.00	4.12	5.00
Pasquotank Trucker .....	7.00	3.29	8.00
Invincible H. G. Fertilizer .....	6.00	4.12	7.00
Kitty Hawk Truck Fertilizer .....	6.00	4.12	7.00
Dewberry Special .....	4.00	6.59	....
Sulphate of Ammonia .....	....	20.59	....
Nitrate of Soda .....	....	14.82	....
Fish Scrap .....	4.00	8.24	....
Muriate of Potash .....	....	....	48.00
Sulphate of Potash .....	....	....	48.00
Manure Salts .....	....	....	20.00
Kainit .....	....	....	12.00
Blood .....	....	13.18	....
Floats .....	27.00	....	....
12% Acid Phosphate .....	12.00	....	....
13% Acid Phosphate .....	13.00	....	....
Electric Grain and Grass Grower .....	8.00	1.00	4.00
Crescent Potash Mixture .....	10.00	....	5.00
Peerless Corn, Wheat and Grass Grower ....	8.00	1.00	4.00
Monarch Wheat and Grass Grower .....	8.00	1.00	7.00
Valley Pride .....	8.00	1.65	4.00
Truck Crop Fertilizer .....	7.00	4.12	7.00
Enterprise High Grade .....	8.00	3.29	11.00
Potash Potato Producer .....	7.00	3.29	8.00
Formula 44 for Bright Wrappers and Smokers	7.00	2.55	3.20
Plant Bed and H. G. Tobacco Fertilizer ....	7.00	2.26	6.00
Special Truck Guano .....	6.00	4.12	7.00
High Grade Top Dresser .....	4.00	6.17	2.50
10% Top Dresser Extra H. G. ....	4.00	8.24	4.00
Special Top Dresser .....	....	7.41	3.00
Johnson's Best .....	20.00	4.94	6.00
Sludge Acid Phosphate .....	14.00	....	....
Goodman's Special Potash Mixture .....	12.00	....	5.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Home Comfort Acid Phosphate .....	12.00	....	....
Virginia 11-5 Bone and Potash .....	11.00	....	5.00
Ideal Crop Grower .....	10.00	2.47	3.00
Sovereign Crop Producer .....	10.00	1.65	2.00
Ford's Wheat and Corn Guano .....	10.00	.82	2.50
Great Texas Cotton Grower Soluble Guano..	9.00	2.47	4.00
Jeffreys H. G. Guano .....	9.00	2.47	3.00
N. & R.'s Best .....	9.00	2.47	3.00
Battle's Crop Grower .....	12.00	....	3.00
Southern Cotton Grower C. S. M. ....	9.00	2.26	2.00
Best's Special Cotton Grower .....	9.00	2.26	2.00
Powell's Special H. G. C. S. M. ....	9.00	2.26	3.00
Prolific Cotton Grower C. S. M. ....	9.00	2.26	2.00
White Stem C. S. M. ....	9.00	2.26	2.00
Standard Cotton Grower C. S. M. ....	9.00	2.26	2.00
Bumper Crop Grower .....	9.00	2.06	5.00
Cuban Special Mixture .....	9.00	1.85	4.00
Cocke's Soluble H. G. Animal Bone.....	9.00	1.85	3.00
No. 923 Guano .....	9.00	1.65	3.00
Reliable Cotton Brand Fertilizer .....	9.00	1.65	3.00
North State Guano C. S. M. ....	9.00	1.65	1.00
Bigelow Crop Guano .....	9.00	.82	3.00
Bernhardt's Grain and Crop Guano .....	9.00	.82	3.00
McCormick's Wheat and Grain Guano .....	9.00	.82	3.00
Farmers' Friend Favorite Fertilizer Special	8.50	1.65	2.00
Nowell & Richardson's Special .....	8.00	3.29	4.00
Farmers' Success .....	8.00	2.47	4.00
Powhatan Crop Mixture .....	8.50	1.65	1.50
Pelican Peruvian Guano Pelican Truck Grow- er and Top Dresser .....	8.00	4.12	5.00
Muse's Special .....	8.00	3.70	7.00
Croom's Crop Grower, best for all crops ...	8.00	3.29	4.00
John F. Croom & Bro., Fish and Meal Mix- ture .....	8.00	3.29	4.00
Fish and Meal Mixture .....	8.00	3.29	4.00
Carr's Crop Grower .....	8.00	3.29	4.00
Lion H. G. Tobacco Fertilizer .....	8.00	2.47	4.00
Croom's Special Cotton Fertilizer, Fish and Meal Mixture .....	8.00	2.47	3.00
Menhaden Fish and Meal Mixture .....	8.00	2.47	3.00
Best's H. G. Cotton and Tobacco Guano ....	8.00	2.47	3.00
Diamond C. S. M. Guano .....	8.00	2.47	3.00
Jumbo Peruvian Guano(Jumbo Crop Grower)	8.00	2.47	3.00
Oldham's Special Compound for Tobacco.....	8.00	2.47	3.00
Blake's Best .....	8.00	2.47	3.00
Royal High Grade Fertilizer .....	8.00	2.47	3.00
Special H. G. Tobacco Fertilizer C. S. M. ..	8.00	2.47	3.00
Adams' Special .....	8.00	2.47	3.00
Peruvian H. G. Tobacco* Guano .....	8.00	2.47	3.00
Red Cliffe H. G. Cotton Grower .....	8.00	2.47	3.00
Zeno Special Compound for Tobacco H. G. ...	8.00	2.47	3.00
Gold Medal H. G. Tobacco Guano .....	8.00	2.47	3.00
Atlas Guano C. S. M. ....	8.00	2.47	2.50
3% Special C. S. M. Guano, No. 3 .....	8.00	2.47	2.00
Pace's Special 5% Potato Guano .....	8.00	1.65	5.00
The Harvester .....	8.00	.82	3.00
Pinnacle Grain Grower .....	8.00	.82	3.00
Pure Raw Bone .....	Total 20.60	3.71	....
Dissolved Animal Bone .....	Total 13.00	2.06	....
Myatt's Special H. G. Fertilizer .....	8.00	2.47	3.00
Admiral C. S. M. ....	8.00	2.47	2.50

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Good Luck C. S. M. ....	8.00	2.47	2.50
Split Silk C. S. M. ....	8.00	2.47	2.50
Orange Grove Guano ....	8.00	2.26	2.50
Delta C. S. M. Guano ....	8.00	2.26	2.50
Royal Crown ....	8.00	2.26	2.00
Blue Star C. S. M. ....	8.00	2.06	3.00
Superlative C. S. M. Guano ....	8.00	2.06	3.00
Smith's Irish Potato Guano ....	8.00	1.65	10.00
Winston Special for Cotton ....	8.00	1.65	2.00
Diamond Dust C. S. M. ....	8.00	1.65	2.00
Plant Food C. S. M. ....	8.00	1.65	2.00
Wilson Standard C. S. M. ....	8.00	1.65	2.00
Ajax C. S. M. Guano ....	8.00	1.65	2.00
Farmers' Favorite Fertilizer C. S. M. ....	8.00	1.65	2.00
Jones Grain Special ....	8.00	....	4.00
Virginia Bone Special ....	8.00	1.65	5.00
Potato and Cabbage Special ....	8.00	1.65	10.00
Moneymaker for Cabbage and Potatoes ....	6.00	1.65	10.00
3-8-3 Tobacco Fertilizer ....	8.00	2.47	3.00
Long Leaf Tobacco Grower ....	8.00	3.29	5.00
3-9-3 Tobacco Fertilizer ....	9.00	2.47	3.00
Grain Mixture ....	9.00	1.03	2.00
Special Wheat Compound ....	8.00	....	4.00
8-5 Potash Mixture ....	8.00	....	5.00
Wythe County Potash Mixture ....	12.00	....	3.00
Climax Potash Mixture ....	16.00	....	2.00
Electric H. G. Special ....	10.00	3.29	4.00
Excelsior H. G. Special ....	8.00	2.47	5.00
Dewberry Special Extra H. G. ....	4.00	6.56	4.00
Special Grain Mixture ....	10.00	1.65	5.00
Concentrate Ammoniated ....	16.00	3.29	4.00
Concentrate Bone and Potash ....	20.00	....	4.00
Concentrate Acid Phosphate ....	24.00	....	....
Cotton Seed Meal ....	....	6.15	....
Maulsby's Fish Guano ....	8.00	1.65	3.00
Special Mixture ....	8.00	2.47	6.00
Best's H. G. Tobacco Fertilizer ....	9.00	2.47	7.00
Boon's Favorite ....	8.00	1.65	5.00
Blake's H. G. Cotton and Tobacco Guano ...	8.00	2.47	3.00
Old Dominion Special Mixture for Tobacco ...	8.00	3.29	4.00
Westfield H. G. Special Tobacco Grower ....	9.00	2.47	3.00
Gray Soil Special H. G. Tobacco Grower ....	9.00	2.47	3.00
Alliance Acid Phosphate ....	16.00	....	....
Alliance Grain Fertilizer ....	8.00	1.65	2.00
Alliance Special Fertilizer ....	8.00	2.47	3.00
Alliance H. G. Manure ....	8.00	3.29	4.00
Clinton Special High Grade ....	5.00	2.47	5.00
Baltimore Special Mixture ....	9.00	.82	2.00
Star Brand Ground Slag ....	Total 17.00	....	....
Valentine Special ....	8.00	2.47	7.00
H. G. Southern Fertilizer Co.'s Scott's ....	10.00	1.65	2.00
Columbus Special Tobacco Guano ....	7.00	2.87	7.00
Formula 161 for Tobacco ....	8.00	3.29	4.00
5-6-7 Potato Fertilizer ....	5.00	4.94	7.00
5-6-5 Potato Fertilizer ....	5.00	4.94	5.00
Formula 101 Tobacco Mixture ....	8.00	2.47	3.00
6-4-7 Tobacco Mixture ....	6.00	3.29	7.00
Sir Walter Tobacco Mixture ....	4.00	3.29	6.00
Tilley's Special Tobacco Grower ....	10.00	2.83	8.00
Paschall's Top Dresser ....	9.50	4.51	....
Spring Dewberry Fertilizer ....	8.00	1.65	12.00



Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
12-2 Bone and Potash .....	12.00	....	2.00
Big Boss .....	12.00	1.65	1.00
Big Chief .....	12.00	1.65	1.00
Duke Special F. & M. Mixture .....	9.00	2.26	5.00
Duke Excelsior Cotton Grower .....	9.00	2.26	5.00
Whitley's Special .....	9.00	3.29	4.00
8-4-7 Complete Fertilizer .....	8.00	3.29	7.00
Special Formula .....	8.00	4.12	10.00
Hoffman's Special Guano .....	8.00	3.29	2.00
"Mann's Special for Tobacco" Dark .....	8.00	2.47	3.00
"Mann's Fish and Meal Guano" .....	8.00	2.47	3.00
Elliott's Special Fish Brand .....	8.00	1.65	2.00
V. C. C. Co.'s Fish Compound .....	8.00	1.65	2.00
V. C. Complete Fertilizer .....	8.00	3.29	6.00
V. C. Formula 101 Special for Cotton .....	8.00	2.47	3.00
V. C. C. Co.'s Gladiator High Grade Truck Fertilizer .....	7.00	4.12	5.00
Butler's Special C. S. M. ....	6.00	3.29	5.00

*Wilson Chemical Co., Wilson, N. C.—*

High Grade 16% Acid Phosphate .....	16.00	....	....
14% Acid Phosphate .....	14.00	....	....
Bone and Potash Mixture, No. 3 .....	10.00	....	5.00
Bone and Potash Mixture, No. 2 .....	10.00	....	4.00
Bone and Potash Mixture, No. 1 .....	10.00	....	2.00
8-4½-7 for Tobacco .....	8.00	3.70	7.00
8-4½-7 for Cotton .....	8.00	3.70	7.00
W. C. Co.'s Gold Medal Cotton Grower ....	8.00	3.30	4.00
W. C. Co.'s Gold Medal Tobacco Grower ....	8.00	3.30	4.00
Planters Formula No. 1 .....	8.00	2.47	10.00
Planters Formula No. 2 .....	8.00	2.47	7.00
W. C. Co.'s Gilt Edge Tobacco Grower ....	8.00	2.47	5.00
East Carolina Cotton Grower .....	8.00	2.47	3.00
East Carolina Tobacco Grower .....	8.00	2.47	3.00
Cotton States Standard .....	8.00	1.65	2.00
Nitrate of Soda .....	....	14.82	....
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	50.00
German Kainit .....	....	....	12.00
High Grade 16% Kainit .....	....	....	16.00

*Winborne Guano Co., Norfolk, Va.*

High Grade Acid Phosphate .....	16.00	....	....
Standard Acid Phosphate .....	14.00	....	....
Best Bone and Potash .....	11.00	....	4.00
Soluble Bone and Potash .....	10.00	....	2.00
Bertie Bone and Potash .....	10.00	....	4.00
Winborne's Triumph Guano .....	8.00	3.30	4.00
Winborne's King Guano .....	8.00	2.47	3.00
Winborne's Special Tobacco Guano .....	8.00	2.47	3.00
Winborne's Crop Grower .....	8.00	1.65	2.00
Winborne's Excelsior Guano .....	8.00	1.65	2.00
Standard Eureka Guano.....	8.00	1.65	2.00
Climax Peanut Guano .....	8.00	.82	4.00
Winborne's 5-7-5 Truck Guano.....	7.00	4.10	5.00
Special 5-6-7 Truck Guano .....	6.00	4.10	7.00
Winborne's Tip Top Tobacco Guano .....	6.00	3.30	5.00
Winborne's Sweet Potato Guano .....	6.00	2.47	6.00
Premium Top Dresser .....	6.00	7.40	3.00
Big Crop 7% Guano .....	5.00	5.75	5.00
Genuine German Kainit .....	....	....	12.00

Name and Address of Manufacturer and Name of Brand.	Avail. Phos. Acid.	Nitrogen.	Potash.
Nitrate of Soda .....	....	15.00	....
Muriate of Potash .....	....	....	50.00
Sulphate of Potash .....	....	....	48.00

*T. W. Wood & Sons, Richmond, Va.—*

Wood's Pure Bone Meal .....	23.00	3.70	....
Standard Bone Meal .....	22.00	2.47	....
Ground Basic Slag .....	17.00	....	....
Standard H. G. Acid Phosphate .....	16.00	....	....
Standard H. G. Acid Phosphate .....	14.00	....	....
Standard Bone and Potash Mixture .....	10.00	....	2.00
Standard Corn Fertilizer .....	9.00	1.23	1.00
Standard Wheat Fertilizer .....	9.00	1.23	1.00
Standard High Grade Trucker Fertilizer ...	8.00	4.93	6.00
Standard Market Grower Fertilizer .....	8.00	3.29	4.00
Standard Vegetable Fertilizer .....	8.00	2.47	3.00
Standard Irish Potato Fertilizer .....	8.00	2.47	10.00
Standard Potato Fertilizer .....	8.00	1.65	5.00
Standard Grain and Grass Fertilizer .....	8.00	1.65	2.00
Wood's Lawn Enricher .....	6.00	2.47	3.00
Kainit .....	....	....	12.00
Nitrate of Soda .....	....	15.63	....

*Wessel, Dural & Co., New York City.—*

Nitrate of Soda .....	....	....	14.85
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*The J. R. Young Fertilizer Co., Inc., Norfolk, Va.—*

High Grade Acid Phosphate .....	16.00	....	....
14% Acid Phosphate .....	14.00	....	....
J. R. Young's 2 $\frac{3}{4}$ -9-2 Guano .....	9.00	2.26	2.00
J. R. Young's Corn Grower .....	9.00	1.00	2.00
J. R. Young's 4-8-4 Crop Grower .....	8.00	3.29	4.00
J. R. Young's Special 2-8-2 Guano .....	8.00	1.65	2.00
J. R. Young's Improved Fish and Bone Ma- nure .....	8.00	3.29	4.00
J. R. Young's 3-6-6 Special for Sweet Potatoes	8.00	2.47	6.00
J. R. Young's Animal Bone Fertilizer.....	8.00	1.00	4.00
J. R. Young's 3-8-6 for Tobacco .....	8.00	2.47	6.00
J. R. Young's 3-8-3 Guano for Cotton.....	8.00	2.47	3.00
J. R. Young's New Process 3-8-3 Guano for Tobacco .....	8.00	2.47	3.00
J. R. Young's New Process Guano for Cotton, Corn and Peanuts .....	8.00	1.65	2.00
J. R. Young's 4-8-3 Special Guano .....	8.00	3.29	3.00
J. R. Young's 5-6-7 Potato Grower .....	6.00	4.11	7.00
J. R. Young's Special Guano for Potatoes....	6.00	4.11	5.00
J. R. Young's Special Guano 3-6-5 .....	6.00	2.47	5.00
J. R. Young's New Process Guano for Truck Crops .....	5.00	5.76	3.50
J. R. Young's Cotton Top Dresser .....	5.00	5.76	4.00
J. R. Young's Top Dresser for Spinach.....	5.00	8.23	....
J. R. Young's Cotton Top Dresser .....	5.00	5.76	4.00
J. R. Young's 4-4-6 Special Tobacco .....	4.00	3.29	6.00
Nitrate of Soda .....	....	14.84	....
Muriate of Potash .....	....	....	49.00
Sulphate of Potash .....	....	....	48.00
J. R. Young's German Kainit .....	....	....	12.00

## LEAF TOBACCO SALES FOR JANUARY, 1915.

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Pounds sold for producers.....	19,738,972
Pounds sold for dealers.....	1,429,794
Pounds sold for warehouses.....	1,828,633
Total.....	22,997,399

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## LEAF TOBACCO SALES FOR FEBRUARY, 1915.

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Pounds sold for producers.....	11,164,561
Pounds sold for dealers.....	944,157
Pounds sold for warehouses.....	1,063,787
Total.....	13,172,505





G. H. HARLOW.  
BRONX PARK.  
NEW YORK, N. Y.

**THE BULLETIN**  
**OF THE**  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE**  
**RALEIGH**

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**Vol. 36, No. 5.**

**MAY, 1915.**

**Whole No. 208.**

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- I. FERTILIZER EXPERIMENTS WITH CORN ON THE SANDY LOAM SOILS (NORFOLK SANDY LOAMS) OF THE COASTAL PLAIN.
- II. VARIETIES, CULTURE AND FERTILIZATION OF CORN ON SANDY LOAM SOILS.

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of March 6, 1900.

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EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS

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## LETTER OF TRANSMITTAL

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HON. W. A. GRAHAM,  
*Commissioner of Agriculture.*

SIR: I submit in manuscript a report covering the experiments with corn on the Edgecombe Test Farm for the years 1903-09 inclusive, together with a discussion of the results. B. W. Kilgore and C. B. Williams are responsible for the plans and conduct of the work in 1903-07; B. W. Kilgore and G. M. MacNider 1907-09; R. W. Pou and R. W. Scott, Jr., had charge of the culture and the handling of the crop, and E. L. Worthen did the main work in putting the results in tabular form. C. B. Williams is responsible for the conclusions and writing of it.

I recommend the publication of this report as the May BULLETIN.

Very respectfully,

C. B. WILLIAMS,  
*Chief, Division of Agronomy.*

Approved for printing:

W. A. GRAHAM, *Commissioner.*



# FERTILIZER EXPERIMENTS WITH CORN ON THE SANDY LOAM SOILS (NORFOLK SANDY LOAMS) OF THE COASTAL PLAIN

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## Being a Report of Work with Corn on the Edgcombe Test Farm in 1903-1909, Inclusive

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BY B. W. KILGORE, C. B. WILLIAMS AND R. W. SCOTT, JR.

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### GENERAL SUMMARY OF THE RESULTS OF FERTILIZER TESTS.

1. The right fertilization of corn may pay fairly well on the sandy loam soils of the State. What this fertilization should be on this and similar soils is indicated by the results of experiments given on the following pages.

2. In the production of corn on this land with only two constituents used, nitrogen combined with phosphoric acid afforded the largest net returns per acre, while a mixture of potash and phosphoric acid gave the smallest profit. The use of phosphoric acid and nitrogen averaged a profit of \$2.34 per acre more than did the phosphoric acid and potash.

The experiments, as a whole, show nitrogen to be the dominant or controlling constituent of plant food for increasing yields and for adding the greatest profit per acre in growing corn on this type of soil.

3. The average results show that lime, whether used alone or in combination with nitrogen, phosphoric acid and potash, was at a slight gain when corn and stover are both considered. On a whole, the indications are that lime will prove beneficial on this soil, if used properly for this crop; especially so when large amounts of organic matter are present or are added to the soil.

4. The amount of nitrogen in the normal fertilizer (300 pounds per acre) applied in the corn experiments was 3 per cent or 9 pounds to the acre. This amount was varied so as to give  $4\frac{1}{2}$ , 9, 18, and 27 pounds of nitrogen per acre. The results emphasize the importance of nitrogen for the production of corn on this soil, when applied in connection with a fair amount of phosphoric acid and some potash. The larger the amount of nitrogen used the greater the yield and the larger the profit. Eighteen pounds of nitrogen would be supplied by 138.4 pounds of 13 per cent dried blood. The average yield of corn during seven years on the plats, receiving three times the normal quantity of nitrogen and normal quantities of phosphoric acid and potash (N; P K), was 37.5 bushels of corn and 2.378 pounds of stover per acre, and the average increase over unfertilized plats, 14.2 bushels of corn and 552 pounds of stover per acre. This fertilizer application cost

\$7.52 per acre, making the cost of fertilizer per bushel of increase in corn 53 cents.

5. The amount of potash in the normal fertilizer (300 pounds per acre) used was  $1\frac{1}{2}$  per cent, or  $4\frac{1}{2}$  pounds per acre. This amount was varied so as to apply 2.2,  $4\frac{1}{2}$ , 9, and  $13\frac{1}{2}$  pounds per acre, respectively. On an average, the results show that the larger quantities were not as profitable as the smaller amount,  $\frac{3}{4}$  per cent in the fertilizer mixture.

6. The amount of phosphoric acid in the normal fertilizer (300 pounds per acre) used was 7 per cent or 21 pounds of phosphoric acid per acre. This quantity was varied so as to apply  $10\frac{1}{2}$ , 21, 42, and 63 pounds respectively of phosphoric acid per acre. These amounts of phosphoric acid would be supplied by 75, 150, 300, and 450 pounds respectively of 14 per cent acid phosphate. The results show that the largest yields on an average came from the use of 150 pounds of 14 per cent acid phosphate, or 21 pounds of phosphoric acid per acre. None of the applications, on an average, paid for the cost of fertilizer, but 150 pounds of acid phosphate with normal amounts of blood and manure salt came nearest, the loss after paying for the fertilizers being 67 cents, when counting the corn and stover. Certain it is that for corn on this soil in its present state 21 pounds of phosphoric acid per acre is ample.

7. Varying the amounts of the normal fertilizer mixture from 150 to 900 pounds per acre gave increased yields, but they proved unprofitable for most of the applications. Profitable returns resulted from 450 to 600 pounds of fertilizer per acre. After paying for the fertilizer itself, the following showing was obtained from different quantities of fertilizer:

150 pounds of fertilizer per acre gave a loss for corn and stover of 53 cents.

300 pounds of fertilizer per acre gave a loss for corn and stover of 67 cents.

450 pounds of fertilizer per acre gave a profit for corn and stover of 88 cents.

600 pounds of fertilizer per acre gave a profit for corn and stover of \$1.80.

900 pounds of fertilizer per acre gave a loss for corn and stover of 88 cents.

8. In the comparison of dried blood and nitrate of soda as sources of nitrogen, the total and increased yields over unfertilized plats were fairly uniform and show on an average a slight advantage for blood over nitrate of soda as a nitrogen furnishing material. The best returns were secured by dividing the blood application, applying one-half at planting with the carriers of phosphoric acid and potash and reserving the other half for application about July 1.

9. When 300 pounds of fertilizer were (1) applied in the drill;

(2) broadcast before planting; and (3) divided into two equal parts, one-half being applied in the drill before planting and the other half as a side dressing about July 1, the broadcast application yielded 39 per cent less increase in grain than did applying the same fertilizer in the drill at planting. Dividing the fertilizer application, applying one-half at planting and the other half about July 1 was used on an average at a loss of \$1.80 per acre, counting both corn and stover.

10. Taking the conclusions under 8 and 9 together, it is seen that where 300 pounds of fertilizer is used to the acre on this character of soil, the most economical method of application is to have all the carriers of potash and phosphoric acid with one-half of the nitrogen as blood applied in the drill at planting, and then apply the remaining half as blood about July 1 along side the corn rows.

11. Our analyses of the various soils of the State indicate that these results will apply to many of the sandy and fine sandy (Norfolk) loams of the upper Coastal Plain section of the State.

## 1. FERTILIZER EXPERIMENTS WITH CORN ON THE SANDY LOAM SOILS OF THE COASTAL PLAIN.

This is the seventh of a series of bulletins giving the results of experiments to determine the fertilizer or plant food needs of different soil types of the State. The previous reports give:

1. Results of Fertilizer and Variety Experiments with Cow Peas on Piedmont Red Clay Loam Soil (June, 1910).

2. Results of Fertilizer Experiments with Cotton on Piedmont Red Clay Loam Soil; and Varieties, Culture and Fertilization of Cotton on Piedmont Red Clay Loam, Red Clay and Valley Soils (August, 1910).

3. Results of Fertilizer Experiments with Corn on Piedmont Red Clay Loam; and Variety, Culture and Fertilization of Corn on Piedmont Red Clay Loam, Red Clay and Valley Soils (September, 1910).

4. Fertilizer Experiments with Cotton on Sandy Loam Soils (Norfolk Sandy Loam) of the Coastal Plain; and Variety, Culture and Fertilization of Cotton on Sandy Loam Soils (April, 1914).

5. Fertilizer Experiments with Cotton on Piedmont Cecil Sandy Loam Soil; and Varieties, Culture and Fertilization of Cotton on Piedmont Cecil Sandy Loam and Red Clay Soils (April, 1914).

6. Fertilizer Experiments with Corn on Piedmont Cecil Sandy Loam Soils; and Varieties, Culture and Fertilization of Corn on Piedmont Cecil Sandy Loam and Red Clay Soils (April, 1915).

More attention is now being paid to the production of corn than ever before in the history of the State and fertilizers are used somewhat more generally on this crop than in former years.

## WORK REPORTED.

Corn is our leading crop from the standpoint of acreage grown each year. Some commercial fertilizers are used in fertilizing and growing this crop. It responds readily and is moderately profitable under a proper system of fertilization. Some thirteen years ago systematic experiments were started to determine the fertilizer or plant food requirements for the most economical production of corn on the different soils of the State.

On the following pages are recorded the results of seven years' fertilizer and variety tests of corn at the Department Test Farm in Edgecombe County, extending through the years 1903-1909, inclusive. The work is being continued in order to collect further data when corn is grown as it has been in the work here recorded, as well as when it has been grown in rotation with other staple and soil-improving crops.

## LOCATION OF FARM AND CHARACTER OF SOIL.

The Edgecombe Test Farm is located near the center of Edgecombe County, on the main road between Tarboro and Rocky Mount and is approximately eight miles from either place. It is two miles south of Kingsboro Station, on the Atlantic Coast Line Railway.

The main upland soil of this farm is representative of much of the Coastal Plain Section of the State. It consists of a dark gray sandy to a fine sandy loam, eight to twelve inches deep, underlain by a yellow sandy clay subsoil. The surface soil is light in texture, and is commonly very deficient in organic matter. It classifies as Norfolk sandy to fine sandy loam. Like most of the sandy soils of the Coastal Plain, the sand content is mostly silica (quartz sand) which contains no important plant food. The chemical analysis of this type of land shows it to be universally deficient in nitrogen and phosphoric acid, and, in the southeastern part of the State, deficient in potash. The potash content is much higher in the northern part of the Coastal Plain Section; especially is this true northeast of Albemarle Sound. The soil of Edgecombe Test Farm is between these two extremes, approaching the low rather than the high potash content. Consequently we could hardly expect an increase from the use of potash to be as great when used on this character of soil in the counties to the north of Edgecombe, but in those to the south, its use should be accompanied with larger increase and greater profit. These light sandy soils are also deficient in lime. This deficiency is noticeable in the growing of legume crops. Bacteriological investigations show this soil to be very low in beneficial bacterial life.

The following figures, which are averages for several samples taken on the Edgecombe Farm, show the chemical composition of the soil.

They state the pounds of plant food in the surface six and two-thirds inches, and in the subsoil twenty-eight inches of an acre:

	Pounds in Surface 6 $\frac{2}{3}$ inches	Pounds in Subsoil 28 inches
Nitrogen (N) .....	984	1,720
Phosphoric Acid ( $P_2O_5$ ).....	1,236	2,200
Potash ( $K_2O$ ) .....	3,810	13,200
Lime ( $CaO$ ) .....	3,595	10,216

#### PLATS.

The plats on which the experiments were conducted were embraced in "Old" Field and in Fields A and B. The farm on which all the plats are located has been in cultivation for a good many years. The experiments were started for corn on "Old" Field in 1903, on Field A in 1905, and on Field B in 1906. The plats in Field A were laid off in three parallel series of thirteen plats each with a turn row or driveway between each series. The plats are one-tenth acre in size or 217.8 feet by 20 feet, with an unfertilized space between plats sufficient for one row and a four-foot unfertilized space at the end of rows. Plats 1, 2 and 3 of the second series and 1, 2, 3, 4, 5, 6, 7, and 8 of the third series of this field are somewhat inferior in natural fertility to the other plats of the field, because of surface washing.

The plats in "Old" Field and in Field B were laid out in a similar way to those of Field A, except that the plats of the third series of Field B were of one-twentieth acre in size, but in the other two series they were of the same dimensions as those of Field A. Another difference was that in Field B provision was made for two rows between the plats instead of one as in Field A and in "Old" Field. These extra rows were fertilized like the plats nearest to them, but were not harvested and weighed with the plats. Work with cotton was started on Field B in 1905. A rotation of cotton and corn on Field A was begun in this same year. Bur clover was sown on Field B at the last cultivation of corn in 1908 and of cotton in 1909, but as the clover failed in 1909, the plats were seeded to crimson clover early in November. The seed were covered by a Planet, Jr., Cultivator, going once to the row.

Field A.—The plats of this field were used for fertilizer experiments with cotton in 1903-04-06-08; and for fertilizer experiments with corn in 1905-07-09. In case of each of these two crops, the same plan or system of fertilization was followed. By this is meant that plat 8 in all cases received only nitrogen and potash, plat 9 only phosphoric acid and potash, plat 10 a normal application of nitrogen, phosphoric acid, and potash and so on. The quantities and proportion actually applied, however, varied with the two crops. The fertilization of the corn plats was based on a normal application of 300 pounds per acre, of a mixture containing 7 per cent available phosphoric acid, 3 per cent of nitrogen

and  $1\frac{1}{2}$  per cent of potash. The fertilization for cotton was on a basis of 400 pounds per acre of a mixture containing 7 per cent available phosphoric acid,  $2\frac{1}{2}$  per cent nitrogen and  $2\frac{1}{2}$  per cent potash.

Field B.—These plats were used for fertilizer experiments with corn in 1906 and 1908 and for fertilizer experiments with cotton in 1905-07-09.

“Old” Field.—These plats were used for fertilizer experiments with corn during 1903 and 1904. Cotton was not grown on this as on Fields A and B.

#### PREPARATION AND CULTIVATION.

The land in all cases was well prepared by breaking with a two-horse turning plow in the winter, usually in January or February to a depth of 8 or 10 inches, and allowed to remain in this condition until just before planting. It was then cut up thoroughly with a disk harrow. The rows were run off 4 feet apart, the fertilizer distributed in the drill and covered to a slight ridge, usually with one furrow of a disk or other cultivator. This operation took place some time prior to planting, so as to give the ground time to settle somewhat before planting. Coker's Prolific was the variety of corn used in planting all experiments. It was usually planted as soon in the spring as the weather would permit. The planting being done on a slight ridge made by covering the fertilizer, but which was usually brought to a level, or almost to a level, by the corn planter. The corn was well cultivated with weeder, harrows, single and two-horse cultivators, requiring not exceeding two furrows to the row for the same cultivation, making the cultivations deep at the beginning and shallow toward the close of the season, when root development of the plants was well extended through the soil. The cultivation was repeated each ten days to two weeks during the season, the crop being laid by July 15 to August 1, according to season. The crop was thinned as nearly as possible to one stalk in the hill, every 30 inches.

#### FERTILIZATION AND FERTILIZER MATERIALS USED.

As already stated, the fertilizer was applied in the drill just before planting the corn, the exact quantity of material for each row being weighed out separately so that each row would get its proper amount of the several fertilizer constituents. Acid phosphate was used as the source of phosphoric acid; dried blood as the source of nitrogen (except where there was a comparison of different nitrogen furnishing materials, or where nitrate of soda was used as a part of the nitrogen), manure salt as the source of potash, and rock or building lime for lime. The fertilizer materials were analyzed each year and application made on the basis of actual analyses, so as to give the exact quantities of nitrogen, phosphoric acid, and potash required for each plat. For the sake of simplicity and convenience in presenting the results of a number of years' experiments, the fertilizer applications are expressed in terms of



acid phosphate containing 14 per cent available phosphoric acid, dried blood containing 13 per cent nitrogen, nitrate of soda containing 14.8 per cent nitrogen, and manure salt containing 20 per cent potash, which figures represent the average composition of these materials. The fertilizer applications in the fertilizer experiments are on the basis of 300 pounds per acre for the normal plat (N P K) of a mixture containing 7 per cent available phosphoric acid, 3 per cent nitrogen, and  $1\frac{1}{2}$  per cent of potash. Lime is applied at the rate of 500 pounds rock or building lime, or 1,000 pounds slaked lime. The fertilizer applications in the tables, in addition to being represented in terms of acid phosphate, dried blood, nitrate of soda and manure salt, are also expressed in terms of the symbols, N, P, K, and L, which have the following significance:

N equals nitrogen at the rate of 9 pounds per acre or 69.2 pounds of 13 per cent dried blood;

P equals phosphoric acid at the rate of 21 pounds per acre, or 150 pounds of 14 per cent acid phosphate;

K equals potash at the rate of 4.5 pounds per acre, or 22.5 pounds 20 per cent manure salt;

L equals lime at the rate of 500 pounds rock, or 1,000 pounds slaked lime per acre.

There are columns in the tables showing the exact weight in pounds of phosphoric acid, nitrogen and potash applied to each plat (expressed on acre basis) which will enable any one to use these same amounts of fertilizer constituents in other materials if desired.

The following average prices which fairly represent the cost of the several materials to the farmer for the period under experimentation have been assumed for the materials used:

14 per cent Acid Phosphate .....	\$14.00 per ton
13 per cent Dried Blood .....	60.00 per ton
14.8 per cent Nitrate of Soda (18 per cent ammonia) .....	50.00 per ton
20 per cent Manure Salt .....	10.00 per ton
Rock Lime .....	10.00 per ton

The arrangement of the plats and the scheme of fertilizer application is shown by the following:

Normal fertilizer application, 300 pounds per acre of a mixture containing:

Phosphoric Acid .....	7 per cent
Nitrogen .....	3 per cent
Potash .....	$1\frac{1}{2}$ per cent

In this normal application—

N equals 9 pounds nitrogen, equals 69.2 pounds 13 per cent dried blood;

P equals 21 pounds phosphoric acid, equals 150 pounds 14 per cent acid phosphate;

K equals 4.5 pounds potash, equals 22.5 pounds 20 per cent manure salt.

Size of Plats, one-tenth acre (217.5 x 20 feet.)

First Series. Application.

8.....	N	K	
9.....	P	K	
10.....	N	P	
11.....	N	P	K
12.....	N $\frac{1}{2}$	P	K
13.....	O		
14.....	N <sub>2</sub>	P	K
15.....	N <sub>3</sub>	P	K
16.....	N	P $\frac{1}{2}$	K
17.....	N	P <sub>2</sub>	K
18.....	N	P <sub>3</sub>	K

Second Series.

1 <sup>2</sup> .....	N	P	K $\frac{1}{2}$
2 <sup>2</sup> .....	N	P	K <sub>2</sub>
3 <sup>2</sup> .....	N	P	K <sub>3</sub>
4 <sup>2</sup> .....	$\frac{1}{2}$	(N P K)	
5 <sup>2</sup> .....	O		
6 <sup>2</sup> .....	1 $\frac{1}{2}$	(N P K)	
7 <sup>2</sup> .....	2	(N P K)	
8 <sup>2</sup> .....	3	(N P K)	
9 <sup>2</sup> .....	N	P	K
10 <sup>2</sup> .....	N	P	K
11 <sup>2</sup> .....	N	P	K
12 <sup>2</sup> .....	N	P	K
13 <sup>2</sup> .....	O		

Third Series.

1 <sup>3</sup> .....	O		
4 <sup>3</sup> .....	N	P	K
5 <sup>3</sup> .....	Lime		
6 <sup>3</sup> .....	N	P	K L
7 <sup>3</sup> .....	N	P	K

The above represents the plats in Field B. In Field A and in "Old" Field they are arranged in a similar way.

## WEATHER CONDITIONS DURING 1900-09, INCLUSIVE.

Besides soil, seed, fertilization, cultivation, and time of planting, weather conditions, mainly the rainfall, influence the crop yield. In the tables presented herewith will be found the monthly and annual rainfall during the years covered by the experiments, the mean monthly and annual rainfall, since 1868 and the same data for the months of May to September, inclusive. During the growing months the rainfall was below normal in all years except 1910 in the years 1903-04 and 1906 this average was approximately an inch or more per month, but for the other three years 1905-'07 and '09 the deficiency of rainfall during the growing season was only slight. The year 1905 was the only one in the period which had a total rainfall below normal.

TABLE A.—RAINFALL IN INCHES AT TARBORO.

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	Means of Observation Since 1868
January.....	4.41	1.85	2.85	3.38	3.21	3.21	3.29	1.01	5.20	2.00	3.89
February.....	5.35	1.92	7.23	6.27	4.24	6.79	4.96	4.84	4.38	3.41	4.15
March.....	2.70	3.02	2.86	5.48	4.09	3.51	5.16	2.85	4.47	1.96	3.92
April.....	3.31	5.45	2.48	4.39	1.17	7.52	.71	4.60	2.03	5.93	3.20
May.....	2.07	5.54	4.83	2.43	2.04	4.46	2.17	3.83	4.31	6.17	4.89
June.....	3.54	1.29	3.08	5.26	2.13	3.66	3.04	5.59	3.27	9.92	4.25
July.....	2.02	8.24	1.12	4.44	4.87	7.83	6.53	5.20	9.36	4.07	6.35
August.....	6.72	11.61	5.86	7.43	5.28	4.66	6.09	6.96	6.74	6.99	6.73
September.....	1.05	8.24	4.16	1.42	2.70	3.00	2.45	3.27	.72	.86	3.47
October.....	1.06	3.51	3.17	4.81	1.91	1.62	2.87	1.33	3.55	1.42	3.59
November.....	3.70	1.23	3.35	.74	4.55	.80	.70	5.08	1.25	1.21	2.55
December.....	3.21	5.11	2.18	2.42	4.48	5.54	3.03	5.05	3.46	2.48	3.75
Annual.....	39.17	57.01	43.17	48.47	40.67	52.60	41.00	49.61	48.74	46.42	50.77
Monthly average from May to September in- clusive.....	3.08	6.96	3.81	4.15	3.40	4.70	4.06	4.97	4.86	5.60	5.14

## RESULTS.

In studying the yields of the three fields it will be well to bear in mind that on Fields A and B the rotation consisted of cotton and corn and that bur clover as a cover crop was not put on Fields A and B until the latter part of July in 1908. Field B was sown in bur clover in the fall of 1909, but as this failed crimson clover was seeded uniformly over the plats early in November.

In the future, as during the past five years (1910-1914) the crops will be grown according to the following rotation:

First Year—Cotton and Crimson Clover.

Second Year—Peanuts.

Third Year—Corn and Cowpeas.

The cotton, peanut and corn crops will be fertilized according to the general scheme of conducting the fertilizer experiments.

The experiments were planned to cover the culture and fertilization of corn as a whole, but the results of the several subdivisions or phases of the subject are grouped in short tables to facilitate examination and the drawing of conclusions, after which they will be considered as a whole and general conclusions drawn for the fertilization of the crop on this type of soil.

TABLE I.—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN; EFFECT OF LIME ALONE; AND LIME IN

Number of Plat	Fertilizer Application Per Acre	RESULTS IN "OLD FIELD"			
		Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre
					1903 1904 1909 Ave.
6	Unfertilized.....	O=			27.1 27.3 ----- 27.2
11	69.2 Pounds 13% Blood.....	N=	9		25.5 40.3 ----- 32.9
	150 Pounds 14% Acid Phosphate.....	P=	21		
12	69.2 Pounds 13% Blood.....	N=	9		24.0 30.3 ----- 27.2
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
13	150 Pounds 14% Acid Phosphate.....	P=	21		20.5 32.9 ----- 26.7
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
12	69.2 Pounds 13% Blood.....	N=	9		28.6 36.4 ----- 32.5
	150 Pounds 14% Acid Phosphate.....	P=	21		
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
8 <sup>2</sup>	Unfertilized.....	O=			22.9 35.6 ----- 29.3
6 <sup>3</sup>	Unfertilized.....	O=			21.3 25.6 ----- 23.45
8 <sup>3</sup>	500 Pounds unslaked Lime every 4th Year.....	L=			20.8 28.1 ----- 24.45
	69.2 Pounds 13% Blood.....	N=	9		
9 <sup>3</sup>	150 Pounds 14% Acid Phosphate.....	P=	21		15.2 22.3 ----- 18.75
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
	500 Pounds Unslaked Lime every 4th year.....	L=			
RESULTS IN FIELD A					
					1905 1907 1909 Ave.
7	Unfertilized.....	O=			27.3 32.5 13.0 24.3
8	69.2 Pounds 13% Blood.....	N=	9		28.4 31.8 16.9 25.7
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
9	150 Pounds 14% Acid Phosphate.....	P=	21		22.3 27.5 17.9 22.6
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
	69.2 Pounds 13% Blood.....	N=	9		
10	150 Pounds 14% Acid Phosphate.....	P=	21		23.6 31.2 20.2 25.0
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
8 <sup>3</sup>	Unfertilized.....	O=			23.1 25.9 18.6 22.5
10 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9		24.3 25.4 24.4 24.7
	150 Pounds 14% Acid Phosphate.....	P=	21		
6 <sup>3</sup>	500 Pounds Unslaked Lime every 4th year.....	L=			22.8 33.6 21.5 25.97
	69.2 Pounds 13% Blood.....	N=	9		
7 <sup>3</sup>	150 Pounds 14% Acid Phosphate.....	P=	21		26.6 37.7 24.0 29.43
	22.5 Pounds 20% Manure Salt.....	K=	4.5		
	500 Pounds Unslaked Lime every 4th year.....	L=			
8 <sup>3</sup>	Unfertilized.....	O=			23.1 25.9 18.6 22.53

NITROGEN, PHOSPHORIC ACID AND POTASH IN ALL DIFFERENT COMBINATIONS;  
ADDITION TO A COMPLETE FERTILIZER.

IN 1903 AND 1904.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer.	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$ .70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Val- uing Stover) Over Cost of Fertilizer
	1903	1904	1909	Ave.						
6	2073	1570	-----	1822			\$	\$	\$	\$
11	2380	2003	-----	2192	5.7	370	5.47	3.13	2.34	.86
12	2235	1485	-----	1860	.0	38	.15	2.31	-2.16	-2.31
13	2315	1515	-----	1915	— .5	93	.02	1.28	-1.26	-1.63
12	3120	1969	-----	2545	3.2	205	3.06	3.36	— .30	-1.12
8 <sup>2</sup>	2758	1921	-----	2340						
6 <sup>3</sup>	2215	1764	-----	1990						
8 <sup>3</sup>	1950	1811	-----	1881	1.0	-109	.26	.63	— .37	.07
9 <sup>3</sup>	1573	1690	-----	1587	-4.7	-403	-4.90	3.99	-8.89	-7.28

IN 1905, 1907 AND 1909.

	1905	1907	1909	Ave.						
7	2275	1410	1520	1735						
8	2500	1255	1640	1798	1.4	63	1.23	2.31	-1.08	-1.33
9	2080	945	1920	1648	-1.7	-87	-1.54	1.28	-2.82	-2.47
10	2635	1145	1800	1860	.7	125	.99	3.36	-2.37	-2.87
8 <sup>3</sup>	1770	1055	2015	1613						
10 <sup>3</sup>	1635	1135	2200	1657	2.2	44	1.72	3.10	-1.38	-1.56
6 <sup>3</sup>	1945	1585	1910	1813	3.44	200	3.21	.63	2.58	1.78
7 <sup>3</sup>	2225	2050	2180	2152	6.90	539	6.99	3.99	3.00	.84
8 <sup>3</sup>	1770	1055	2015	1613						

TABLE I—

RESULTS IN FIELD B

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1906	1908	1909	Ave.
8	69.2 Pounds 13% Blood.....	N=	9	-----	21.7	20.5	-----	21.1
	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5				
9	150 Pounds 14% Acid Phosphate.....	P=	21	-----	16.5	14.8	-----	15.75
	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5				
10	69.2 Pounds 13% Blood.....	N=	9	-----	21.8	17.7	-----	19.8
	150 Pounds 14% Acid Phosphate.....	P=	21	-----				
11	69.2 Pounds 13% Blood.....	N=	9	-----	19.3	19.0	-----	19.2
	150 Pounds 14% Acid Phosphate.....	P=	21	-----				
13	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5	16.6	15.1	-----	15.85
	Unfertilized.....	O=	-----	-----				
1 <sup>3</sup>	Unfertilized.....	O=	-----	-----	13.3	7.6	-----	10.45
5 <sup>3</sup>	500 Pounds Unslaked Lime every 4th year.....	L=	-----	-----	17.0	10.6	-----	13.8
6 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9	-----	22.9	20.4	-----	21.65
	150 Pounds 14% Acid Phosphate.....	P=	21	-----				
	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5				
	500 Pounds Unslaked Lime every 4th year.....	L=	-----	-----				
AVERAGE RESULTS FOR SEVEN YEARS IN								
								Ave.
6-8-13	Unfertilized.....	O=	-----	-----	-----	-----	-----	21.95
11-10-10	69.2 Pounds 13% Blood.....	N=	9	-----	-----	-----	-----	25.6
	150 Pounds 14% Acid Phosphate.....	P=	21	-----				
6-7-13	Unfertilized.....	O=	-----	-----	-----	-----	-----	22.7
12-8-8	69.2 Pounds 13% Blood.....	N=	9	-----	-----	-----	-----	24.8
	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5				
13-9-9	150 Pounds 14% Acid Phosphate.....	P=	21	-----	-----	-----	-----	21.8
	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5				
8-7-13	Unfertilized.....	O=	-----	-----	-----	-----	-----	23.3
12-10-11	69.2 Pounds 13% Blood.....	N=	9	-----	-----	-----	-----	25.5
	150 Pounds 14% Acid Phosphate.....	P=	21	-----				
	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5				
6-8-1-1 <sup>3</sup>	Unfertilized.....	O=	-----	-----	-----	-----	-----	19.34
8-6-3-5 <sup>3</sup>	500 Pounds Unslaked Lime every 4th year.....	L=	-----	-----	-----	-----	-----	22.05
9-7-3-6 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9	-----	-----	-----	-----	24.15
	150 Pounds 14% Acid Phosphate.....	P=	21	-----				
	22.5 Pounds 20% Manure Salt.....	K=	-----	4.5				
	500 Pounds Unslaked Lime every 4th year.....	L=	-----	-----				



Continued.

IN 1906 AND 1908.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$ .70 Per Bushel and Stover at \$8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
	1906	1908	1909	Ave.						
8	2315	2183	-----	2249	5.4	800	\$ 6.98	\$ 2.31	\$ 4.67	\$ 1.47
9	1943	1328	-----	1636	— .2	187	0.61	1.28	— .67	—1.14
10	2308	1778	-----	2043	3.9	594	5.11	3.13	1.98	— .40
11	2493	1638	-----	2066	3.3	617	4.78	3.36	1.42	—1.05
13	1690	1207	-----	1449	-----	-----	-----	-----	-----	-----
1 <sup>3</sup>	1530	875	-----	1203	-----	-----	-----	-----	-----	-----
5 <sup>3</sup>	1560	1375	-----	1468	3.35	265	3.41	.63	2.78	1.72
6 <sup>3</sup>	1825	1395	-----	1610	11.2	407	9.47	3.99	5.48	3.85

"OLD FIELD," AND FIELDS A AND B.

			Ave.						
6-8-13	-----	-----	1626	-----	-----	-----	-----	-----	-----
11-10-10	-----	-----	1920	3.6	294	3.70	3.13	.60	— .61
6-7-13	-----	-----	1678	-----	-----	-----	-----	-----	-----
12-8-8	-----	-----	1945	2.1	267	2.54	2.31	.23	— .84
13-9-9	-----	-----	1721	— .9	43	— .46	1.28	—1.74	—1.91
8-7-13	-----	-----	1826	-----	-----	-----	-----	-----	-----
1-10-11	-----	-----	2115	2.2	288	2.69	3.36	— .67	—1.82
6-8-1 <sup>3</sup>	-----	-----	1603	-----	-----	-----	-----	-----	-----
8-6-5 <sup>3</sup>	-----	-----	1734	2.71	131	2.42	.63	1.79	1.27
9-7-6 <sup>3</sup>	-----	-----	1836	4.81	233	4.30	3.99	.31	— .62

# EFFECT OF NITROGEN, PHOSPHORIC ACID, POTASH, AND LIME ALONE AND IN COMBINATION WITH EACH OTHER ON CORN YIELDS.

The experiments, the results of which are presented in Table 1, were planned to show the effect on the yield of corn of different fertilizer applications, when two of the constituents were applied together, as nitrogen and phosphoric acid (N P) nitrogen and potash (N K), and phosphoric acid and potash (P K), and when all three of these fertilizer constituents were applied to make a complete fertilizer (N P K); also to test the effect of lime (L) when used alone and when used in connection with a complete fertilizer (N P K L).

The results are shown as follows: yields of bushels of shelled corn and pounds of stover per acre for the several years; average yields, average increases over the unfertilized (O) plats (this represents the effect of the fertilizer applications), the value of the increase, the cost of the fertilizer, and the value of the increased yield of corn and stover and of corn alone over cost of fertilizer. The value of the increased yield of corn and stover and of corn alone represent the profit from the several fertilizer applications after paying for the fertilizer itself.

In these experiments the corn was cut, shocked and shredded, the stover being all of the plant except the corn on the cob.

## NITROGEN AND PHOSPHORIC ACID, N P (Plats 11, 10<sup>3</sup>, and 10).

Nitrogen and phosphoric acid increased the yields over the unfertilized plats four out of the seven years, and the average yield on each of the three fields was an increase. The average annual increase for the two years on "Old Field" was 5.7 bushels of corn per acre; for three years on Field A, 2.2 bushels of corn per acre; and for two years on Field B 3.9 bushels, or an average annual increase for the seven years in the three fields of 3.6 bushels, worth 61 cents less than the cost of fertilizer for corn alone, which is 60 cents gain for the increased yield of corn and stover.

## NITROGEN AND POTASH, N K (Plats 12, 8 and 8).

The application of nitrogen and potash combined gave a small increase on Fields A and B while on "Old Field" the average yield was the same as with no fertilizer. The average increase for the seven years for all three fields was 2.1 bushels per acre. Considering the grain alone this mixture was applied at an annual loss of 84 cents, but when the value of the increase of stover is taken into account, there is a profit of 23 cents.

## PHOSPHORIC ACID AND POTASH, P K (Plats 13, 9 and 9).

Phosphoric acid and potash combined shows a decrease in corn on all three fields, the average annual decrease on "Old Field" for two years being 0.5 bushels per acre; for three years on Field A 1.7 bushels; and for two years on Field B 0.2 bushels or an average of 0.9 bushels for the three. On the basis of corn alone this mixture was applied at

a loss of \$1.91 per acre, and even including stover the loss per acre was \$1.74.

NITROGEN, PHOSPHORIC ACID, AND POTASH, N P K (Plats 12, 10, and 11).

When all three of the fertilizer materials were used together to make a complete fertilizer average increased yields were obtained on all three plats. The average annual increase on "Old Field" being 3.2 bushels of corn per acre, for three years in Field A 0.7 bushels, and for the two years on Field B 3.3 bushels, or an annual average increase for the seven years in the three fields of 2.2 bushels, worth \$1.82 less than the cost of fertilizer on the basis of corn alone, or 67 cents less on the basis of corn and stover.

LIME, L (Plats 8<sup>3</sup> and 6<sup>3</sup> and 5<sup>3</sup>).

Lime was applied at the rate of 500 pounds rock or 1,000 pounds slaked lime per acre every fourth year. On the plat in "Old Field" during two years there was a loss of 37 cents per acre from the use of lime. On the plat in Field A there was a gain of \$2.58 annually per acre, and on the plat in Field B in two years' test a profit of \$2.78 the average for the seven years being a profit of \$1.79 per acre.

LIME WITH A COMPLETE FERTILIZER, N P K L (Plats 9<sup>3</sup>, 7<sup>3</sup> and 6<sup>3</sup>).

When lime was used in combination with the fertilizer constituents there was less corn produced on the plat in "Old" Field than where the three fertilizer constituents were used without lime, but on the plats on Fields A and B there was a decided gain for the use of lime all three years. For the average of two years on "Old" Field lime and complete fertilizer gave an annual loss of \$8.89, but on both A and B it was applied with a decidedly greater profit than a complete fertilizer alone. The reduced yield in "Old" Field is due largely to the lack of uniformity of the land.

From an average of all the results the following is evident:

(1) That nitrogen and phosphoric acid gave an average increase of 3.6 bushels of corn in each of the three fields. This increase in grain was not enough to pay for the fertilizer but when the increase in stover is also considered the application gave the small profit of 60 cents.

(2) That nitrogen and potash gave even a smaller average increase than did nitrogen and phosphoric acid; this increase being only 2.1 bushels. Considering the grain alone this represents a loss of 84 cents and a profit of 23 cents when stover also is included.

(3) That phosphoric acid and potash fail to give an increase on any of the fields and consequently was in all cases applied at a financial loss.

(4) That the use of nitrogen, phosphoric acid and potash combined in a normal mixture gave an increase on all three fields but this increase was not enough to pay for the fertilizer application.

(5) That lime alone gave a small profit.

(6) That lime in addition to a complete fertilizer gave marked increase in yield and was accompanied with profit.

TABLE II—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN—

		RESULTS IN "OLD FIELD"						
Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1903	1904	1909	Ave.
2 <sup>2</sup>	34.6 Pounds 13% Blood.....	$\frac{1}{2}$ N= 4.5			23.1	33.4	-----	28.3
	150 Pounds 14% Acid Phosphate.....	P= 21						
	22.5 Pounds 20% Manure Salt.....	K= 4.5						
1 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			28.6	36.4	-----	32.5
	150 Pounds 14% Acid Phosphate.....	P= 21						
	22.5 Pounds 20% Manure Salt.....	K= 4.5						
3 <sup>2</sup>	138.4 Pounds 13% Blood.....	2 N= 18			29.2	39.4	-----	34.3
	150 Pounds 14% Acid Phosphate.....	P= 21						
	22.5 Pounds 20% Manure Salt.....	K= 4.5						
4 <sup>2</sup>	207.6 Pounds 13% Blood.....	3 N= 27			34.9	44.1	-----	39.5
	150 Pounds 14% Acid Phosphate.....	P= 21						
	22.5 Pounds 20% Manure Salt.....	K= 4.5						
8 <sup>2</sup>	Untertilized.....	O=			22.9	35.6	-----	29.2

RESULTS IN FIELD A						
			1905	1907	1909	Ave.
7	Untertilized.....	O=				27.3 32.5 13.0 24.26
11	34.6 Pounds 13% Blood.....	$\frac{1}{2}$ N= 4.5				21.2 31.1 17.2 23.16
	150 Pounds 14% Acid Phosphate.....	P= 21				
	22.5 Pounds 20% Manure Salt.....	K= 4.5				
10	69.2 Pounds 13% Blood.....	N= 9				23.6 31.2 20.2 25.0
	150 Pounds 14% Acid Phosphate.....	P= 21				
	22.5 Pounds 20% Manure Salt.....	K= 4.5				
12	138.4 Pounds 13% Blood.....	2 N= 18				28.1 36.3 28.0 30.8
	150 Pounds 14% Acid Phosphate.....	P= 21				
	22.5 Pounds 20% Manure Salt.....	K= 4.5				
13	207.6 Pounds 13% Blood.....	3 N= 27				41.0 45.9 37.4 41.43
	150 Pounds 14% Acid Phosphate.....	P= 21				
	22.5 Pounds 20% Manure Salt.....	K= 4.5				

## EFFECT OF VARYING QUANTITIES OF NITROGEN ON YIELDS.

IN 1903 AND 1904.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Val- uing Stover) Over Cost of Fertilizer
	1903	1904	1909	Ave.						
2 <sup>2</sup>	2645	1876	-----	2261	-1.0	-79	\$. -1.02	2.32	\$. -3.34	\$. -3.02
1 <sup>2</sup>	3120	1969	-----	2545	3.2	205	3.06	3.36	-.30	-1.12
3 <sup>2</sup>	1935	2067	-----	2026	5.05	-314	2.28	5.44	-3.16	-1.90
4 <sup>2</sup>	3250	1277	-----	2264	10.25	-76	6.87	7.52	-.65	-.34
8 <sup>2</sup>	2758	1921	-----	2340	-----	-----	-----	-----	-----	-----

IN 1905, 1907, AND 1909.

	1905	1907	1909	Ave.						
7	2275	1410	1520	1735	-----	-----	-----	-----	-----	-----
11	2158	1155	1920	1744	-1.1	9	-.73	2.32	-3.05	-3.09
10	2635	1145	1800	1860	.7	125	.99	3.36	-2.37	-2.87
12	2720	950	2195	1955	6.54	220	5.46	5.44	.02	-.86
13	2760	1760	2775	2432	17.17	697	14.81	7.52	7.29	4.50

TABLE II—

## RESULTS IN FIELD B

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1906	1908	1909	Ave.
12	34.6 Pounds 13% Blood.....	1½ N= 4.5						
	150 Pounds 14% Acid Phosphate.....	P=	21		15.1	17.1		16.1
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	69.2 Pounds 13% Blood.....	N=	9					
11	150 Pounds 14% Acid Phosphate.....	P=	21		19.3	19.0		19.2
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
13	Unfertilized.....	O=			16.6	15.1		15.85
14	138.4 Pounds 13% Blood.....	2 N= 18						
	150 Pounds 14% Acid Phosphate.....	P=	21		23.1	25.1		24.1
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	207.6 Pounds 13% Blood.....	3 N= 27						
15	150 Pounds 14% Acid Phosphate.....	P=	21		29.8	29.8		29.8
	22.5 Pounds 20% Manure Salt.....	K=	4.5					

## AVERAGE RESULTS FOR SEVEN YEARS

								Ave.
8 <sup>2</sup> -7-13	Unfertilized.....	O=						23.3
2 <sup>2</sup> -11-12	34.6 Pounds 13% Blood.....	1½ N= 4.5						
	150 Pounds 14% Acid Phosphate.....	P=	21					22.6
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
1 <sup>2</sup> -10-11	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P=	21					25.5
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
3 <sup>2</sup> -12-14	138.4 Pounds 13% Blood.....	2 N= 18						
	150 Pounds 14% Acid Phosphate.....	P=	21					29.9
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
4 <sup>2</sup> -13-15	207.6 Pounds 13% Blood.....	3 N= 27						
	150 Pounds 14% Acid Phosphate.....	P=	21					37.5
	22.5 Pounds 20% Manure Salt.....	K=	4.5					

## EFFECT OF VARYING QUANTITIES OF NITROGEN.

The experiments in table 2 were planned to test the effect on yield of corn and stover of varying quantities of nitrogen leaving the phosphoric and potash constant.

On one plat the nitrogen was reduced to one-half the normal quantity, making the application 4½ pounds of nitrogen per acre, or practically 1½ per cent in the fertilizer mixture. On two of the plats it was increased by two and three times the normal quantity (9 pounds per acre), making the application 18 and 27 pounds per acre, respectively, or on the four plats 4½, 9, 18, and 27 pounds of nitrogen per acre.

*Continued.*

IN 1906 AND 1908.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer.	Average Increase in Pounds of Stover Per Acre Due to Fertilizer.	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
	1906	1908	1909	Ave.						
12	2095	1373	-----	1734	.16	285	\$ 1.23	\$ 2.32	\$ -1.09	\$ 1.21
11	2493	1638	-----	2066	3.3	617	4 78	3.36	1.42	-1 05
13	1690	1207	-----	1449	-----	-----	-----	-----	-----	-----
14	2313	2218	-----	2266	8.2	817	9.01	5 44	3.57	.30
15	2725	2098	-----	2412	13.9	962	13.58	7.52	6.06	2.21

IN "OLD FIELD" AND IN FIELDS A AND B.

		Ave.							
8 <sup>2</sup> -7-13	-----	1826	-----	-----	-----	-----	-----	-----	-----
2 <sup>2</sup> -11-12	-----	1889	— .7	63	— .24	2.32	—2.56	—2.81	-----
1 <sup>2</sup> -10-11	-----	2115	2 2	288	2.69	3.36	— .67	—1.82	-----
3 <sup>2</sup> -12-14	-----	2067	6.6	241	55.8	5.44	.14	— .82	-----
4 <sup>2</sup> -13-15	-----	2378	14.2	552	12.15	7.52	4.63	2.42	-----

The average results for three years for Field A show that the largest profits came from the application containing three times the normal quantity of nitrogen per acre, or 27 pounds, the average yield being 41.4 bushels of corn per acre and the profit \$4.50 over the cost of fertilizer, on the basis of corn alone, or \$7.29 on the basis of corn and stover. For two years on "Old" Field the largest profit was also from the application containing three times the normal quantity of nitrogen, the average yield of corn being 39.5 bushels per acre, which represents an increase of 10.3 bushels. This increase, however, was not enough to pay for the fertilizer. The applications on the basis of corn alone show a loss of 34 cents, or 65 cents loss on the basis of corn and stover.

The other three applications were also made at a loss. In the case of Field B the three times normal application shows the best return, the yield of corn being 29.8 bushels, and the profit \$2.21, over the cost of fertilizer, on the basis of corn alone and \$6.06 on the basis of corn and stover. As an average for the seven years,  $4\frac{1}{2}$  and 9 pounds of nitrogen per acre ( $\frac{1}{2}$  normal and normal) were applied at a loss; 18 pounds barely paid for itself; but 27 pounds (three times normal) gave a profit of \$4.63.

TABLE III—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN—

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid ( $P_2O_5$ ) Per Acre	Pounds of Potash ( $K_2O$ ) Per Acre	RESULTS IN "OLD FIELD"			
					Yield in Bushels of Shelled Corn Per Acre			
					1903	1904	1909	Ave.
5 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			27.4	35.6		31.5
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
1 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			28.6	36.4		32.5
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
6 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			26.9	37.5		32.2
	300 Pounds 14% Acid Phosphate.....	2 P=	42					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
7 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			22.9	35.8		29.35
	450 Pounds 14% Acid Phosphate.....	3 P=	63					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
8 <sup>2</sup>	Unfertilized.....	O=			22.9	29.9		26.4
RESULTS IN FIELD A								
					1905	1907	1909	Ave.
1 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			17.8	24.4	12.8	18.3
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
7	Unfertilized.....	O=			27.3	32.5	13.0	24.26
10	69.2 Pounds 13% Blood.....	N= 9			23.6	31.2	20.2	25.0
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
2 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			17.6	27.3	11.2	18.7
	300 Pounds 14% Acid Phosphate.....	2 P=	42					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
3 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			17.2	29.6	17.2	21.3
	450 Pounds 14% Acid Phosphate.....	3 P=	63					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
7 <sup>2</sup>	Unfertilized.....	O=						





TABLE III—  
RESULTS IN FIELD B

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid ( $P_2O_5$ ) Per Acre	Pounds of Potash ( $K_2O$ ) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1906	1908	1909	Ave.
13	Unfertilized.....	O=			16.6	15.1		15.9
16	69.2 Pounds 13% Blood.....	N=	9		17.0	16.7		16.85
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
11	69.2 Pounds 13% Blood.....	N=	9		19.3	19.0		19.2
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
17	69.2 Pounds 13% Blood.....	N=	9		19.3	20.0		19.7
	300 Pounds 14% Acid Phosphate.....	2 P=	42					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
18	69.2 Pounds 13% Blood.....	N=	9		21.1	20.9		21.0
	450 Pounds 14% Acid Phosphate.....	3 P=	63					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					

AVERAGE RESULTS FOR SEVEN YEARS

								Ave.
8 <sup>2</sup> -7 <sup>2</sup> -13	Unfertilized.....	O=						20.9
5 <sup>2</sup> -1 <sup>2</sup> -16	69.2 Pounds 13% Blood.....	N=	9					21.67
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
8 <sup>2</sup> -7-13	Unfertilized.....	O=						23.3
1 <sup>2</sup> -10-11	69.2 Pounds 13% Blood.....	N=	9					25.5
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
6 <sup>2</sup> -2 <sup>2</sup> -17	69.2 Pounds 13% Blood.....	N=	9					22.8
	300 Pounds 14% Acid Phosphate.....	2 P=	42					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
7 <sup>2</sup> -3 <sup>2</sup> -18	69.2 Pounds 13% Blood.....	N=	9					23.5
	450 Pounds 14% Acid Phosphate.....	3 P=	63					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					

*Continued.*

IN 1906 AND 1908.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Val- uing Stover) Over Cost of Fertilizer
	1906	1908	1909	Ave.						
13	1690	1207	-----	1449	-----	-----	\$-----	\$-----	\$-----	\$-----
16	1963	1648	-----	1806	.95	377	2.17	2.84	— .57	—2.18
11	2493	1638	-----	2066	3.3	617	4.78	3.36	1.42	—1.05
17	2338	1770	-----	2054	3.8	605	5.08	4.41	.67	—1.75
18	2108	1858	-----	1983	5.1	534	5.71	5.46	.25	—1.89

IN "OLD FIELD" AND IN FIELDS A AND B.

			Ave.							
8 <sup>2</sup> -7 <sup>2</sup> -13	-----	-----	1604	-----	-----	\$-----	\$-----	\$-----	\$-----	-----
5 <sup>2</sup> -1 <sup>2</sup> -16	-----	-----	1774	.77	170	1.22	2.84	—1.62	—2.30	-----
8 <sup>2</sup> -7-13	-----	-----	1826	-----	-----	-----	-----	-----	-----	-----
1 <sup>2</sup> -10-11	-----	-----	2115	2.2	288	2.69	3.36	— .67	—1.82	-----
6 <sup>2</sup> -2 <sup>2</sup> -17	-----	-----	1859	1.9	255	2.35	4.41	—2.06	—3.08	-----
7 <sup>2</sup> -3 <sup>2</sup> -18	-----	-----	1942	2.6	338	3.19	5.46	—2.27	—3.62	-----

## EFFECT OF VARYING QUANTITIES OF PHOSPHORIC ACID.

The above experiments in Table 3 were planned to show the effect on yields of corn and stover of varying quantities of phosphoric acid, the nitrogen and potash remaining the same. On one plat one-half the normal quantity of phosphoric acid was applied or an amount represented by 75 pounds of 14 per cent acid phosphate and equivalent to  $3\frac{1}{2}$  per cent phosphoric acid in the fertilizer mixture. On two plats were applied two and three times the normal quantities of phosphoric

TABLE IV.—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN—

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid ( $P_2O_5$ ) Per Acre	Pounds of Potash ( $K_2O$ ) Per Acre	RESULTS IN OLD FIELD			
					Yield in Bushels of Shelled Corn Per Acre			
					1903	1904	1909	Ave.
8 <sup>2</sup>	Unfertilized.....	O=			22.9	29.9		26.4
1 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			28.6	36.4		32.5
	150 Pounds 14% Acid Phosphate.....	P= 21						
9 <sup>2</sup>	22.5 Pounds 20% Manure Salt.....	K=	4.5		24.3	30.7		27.5
	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21						
	45 Pounds 20% Manure Salt.....	2 K=	9					
10 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			22.0	32.9		27.45
	150 Pounds 14% Acid Phosphate.....	P= 21						
	67.5 Pounds 20% Manure Salt.....	3 K=	13.5					
10 <sup>3</sup>	69.2 Pounds 13% Blood.....	N= 9			29.2	36.4		32.8
	150 Pounds 14% Acid Phosphate.....	P= 21						
	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	2.2					
6 <sup>3</sup>	Unfertilized.....	O=			21.3	25.6		23.5

					RESULTS IN FIELD A			
					1905	1907	1909	Ave.
4 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			22.3	30.5	16.7	23.2
	150 Pounds 14% Acid Phosphate.....	P= 21						
	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	2.2					
7	Unfertilized.....	O=			27.3	32.5	13.0	24.26
10	69.2 Pounds 13% Blood.....	N= 9			23.6	31.2	20.2	25.0
	150 Pounds 14% Acid Phosphate.....	P= 21						
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
5 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			23.2	31.2	20.2	24.9
	150 Pounds 14% Acid Phosphate.....	P= 21						
	45 Pounds 20% Manure Salt.....	2 K=	9					
6 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9			24.4	37.4	21.6	27.8
	150 Pounds 14% Acid Phosphate.....	P= 21						
	67.5 Pounds 20% Manure Salt.....	3 K=	13.5					
7 <sup>2</sup>	Unfertilized.....	O=			23.4	26.5	12.0	20.6

acid represented by 300 and 450 pounds of 14 per cent acid phosphate respectively, or 42 and 63 pounds of phosphoric acid per acre.

Varying the amounts of phosphoric acid had no very marked effect on the yield of corn. In all cases the fertilizer was applied at a loss. The normal application came nearer paying for itself than any other. These results show that for corn on this class of soil large amounts of phosphoric acid in the form of acid phosphate cannot be applied with profit.

## EFFECT OF VARYING QUANTITIES OF POTASH.

IN 1903 AND 1904.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer.	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
	1903	1904	1909	Ave.						
8 <sup>2</sup>	2758	1707	-----	2233	-----	-----	\$-----	\$-----	\$-----	\$-----
1 <sup>2</sup>	3120	1969	-----	2545	3.2	205	3.06	3.36	— .30	—1.12
9 <sup>2</sup>	2610	1504	-----	2057	1.1	—176	.07	3.59	—3.52	—2.82
10 <sup>2</sup>	2520	1809	-----	2165	1.05	—68	.46	3.82	—3.36	—3.09
10 <sup>3</sup>	2430	2144	-----	2287	9.8	297	8.05	3.25	4.80	3.61
6 <sup>3</sup>	2215	1764	-----	1990	-----	-----	-----	-----	-----	-----

IN 1905, 1907 AND 1909.

	1905	1907	1909	Ave.						
4 <sup>2</sup>	2630	1095	1805	1843	2.6	556	4.04	3.25	.79	—1.43
7	2275	1410	1520	1735	-----	-----	-----	-----	-----	-----
10	2635	1145	1800	1860	.7	125	.99	3.36	—2.37	—3.31
5 <sup>2</sup>	2563	1300	1800	1888	4.3	601	5.41	3.59	1.82	— .58
6 <sup>2</sup>	2680	1280	2055	2005	7.2	718	7.91	3.82	4.09	1.22
7 <sup>2</sup>	2005	1015	840	1287	-----	-----	-----	-----	-----	-----

TABLE IV—  
RESULTS IN FIELD B

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1906	1908	1909	Ave.
1 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21			20.0	21.1		20.6
	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K= 2.2						
13	Unfertilized.....	O=			16.6	15.1		15.9
11	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21			19.3	19.0		19.2
	22.5 Pounds 20% Manure Salt.....	K= 4.5						
2 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21			16.5	17.1		16.8
	45 Pounds 20% Manure Salt.....	2 K= 9						
3 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21			13.5	13.6		13.55
	67.5 Pounds 20% Manure Salt.....	3 K= 13.5						
5 <sup>2</sup>	Unfertilized.....	O=			14.6	9.6		12.1

AVERAGE RESULTS FOR SEVEN YEARS

								Ave.
6 <sup>2</sup> -7 <sup>2</sup> -5 <sup>2</sup>	Unfertilized.....	O=						19.0
	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21						25.5
10 <sup>2</sup> -4 <sup>2</sup> -1 <sup>2</sup>	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K= 2.2						
	Unfertilized.....	O=						23.3
	69.2 Pounds 13% Blood.....	N= 9						
1 <sup>2</sup> -10-11	150 Pounds 14% Acid Phosphate.....	P= 21						25.5
	22.5 Pounds 20% Manure Salt.....	K= 4.5						
	Unfertilized.....	O=						19.8
8 <sup>2</sup> -7 <sup>2</sup> -5 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21						23.3
	45 Pounds 20% Manure Salt.....	2 K= 9						
9 <sup>2</sup> -5 <sup>2</sup> -2 <sup>2</sup>	69.2 Pounds 13% Blood.....	N= 9						
	150 Pounds 14% Acid Phosphate.....	P= 21						23.6
	67.5 Pounds 20% Manure Salt.....	3 K= 13.5						

## EFFECT OF DIFFERENT QUANTITIES OF POTASH.

The experiments reported in Table 4 were arranged to show the effect on the yield of corn and stover of varying quantities of potash, the nitrogen and phosphoric acid remaining constant. On one plat only one-half the normal quantity of potash was applied or  $\frac{3}{4}$  per cent in the fertilizer mixture, or 2.2 pounds of potash per acre. On two other plats two and three times the normal quantities were given, or 9 and

Continued.

IN 1906 AND 1908.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
	1906	1908	1909	Ave.						
1 <sup>2</sup>	2193	1586	-----	1890	8.5	504	\$ 7.97	\$ 3.25	\$ 4.72	\$ 2.70
13	1690	1207	-----	1449	-----	-----	-----	-----	-----	-----
11	2493	1638	-----	2066	3.3	617	4.78	3.36	1.42	-1.05
2 <sup>2</sup>	2148	1520	-----	1834	4.7	448	5.23	3.59	1.64	— .30
3 <sup>2</sup>	1613	1413	-----	1513	1.5	127	1.52	3.82	-2.30	-2.77
5 <sup>2</sup>	1733	1038	-----	1386	-----	-----	-----	-----	-----	-----

IN "OLD FIELD" AND IN FIELDS A AND B.

				Ave.						
6 <sup>1</sup> -7 <sup>2</sup> -5 <sup>2</sup>	-----	-----	-----	1516	-----	-----	-----	-----	-----	-----
10 <sup>2</sup> -4 <sup>2</sup> -1 <sup>2</sup>	-----	-----	-----	1983	6.5	467	6.42	3.25	3.17	1.30
8 <sup>2</sup> -7-13	-----	-----	-----	1826	-----	-----	-----	-----	-----	-----
1 <sup>2</sup> -10-11	-----	-----	-----	2115	2.2	282	2.69	3.36	— .67	-1.82
8 <sup>2</sup> -7 <sup>2</sup> -5 <sup>2</sup>	-----	-----	-----	1586	-----	-----	-----	-----	-----	-----
9 <sup>2</sup> -5 <sup>2</sup> -2 <sup>2</sup>	-----	-----	-----	1921	3.5	335	3.79	3.59	.20	-1.14
10 <sup>2</sup> -6 <sup>2</sup> -3 <sup>2</sup>	-----	-----	-----	1910	3.9	324	3.97	3.82	.15	-1.09

13.5 pounds per acre. This would make the application of potash on the several plats 2.2, 4.5, 9, and 13.5 pounds. The results in all of the fields are uniform in showing that large quantities were not as profitable as the normal amount, 1½ per cent in the fertilizer mixture, or 4½ pounds per acre. The very small quantity, ¾ per cent in the fertilizer mixture or 2.2 pounds per acre, was more profitable and effective in increasing yields than was the normal quantity. The results on both

"Old" Field and Field B show larger yields where one-half the normal application of potash was used. The average increase for the three years on Field A, however, shows a larger increase and also profit from the application of three times the normal amount of potash. The indications are that Plat 12, Field B, is naturally more fertile than those

TABLE V.—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN—

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid ( $P_2O_5$ ) Per Acre	Pounds of Potash ( $K_2O$ ) Per Acre	RESULTS IN "OLD FIELD"			
					Yield in Bushels of Shelled Corn Per Acre			
					1903	1904	1909	Ave.
8 <sup>2</sup>	Untertilized.....	O=	—	—	22.9	29.9	—	26.4
11 <sup>2</sup>	34.6 Pounds 13% Blood.....	$\frac{1}{2}$ N=	4.5	—	22.5	28.8	—	25.7
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5	—				
	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	—	2.2				
1 <sup>2</sup>	69.2 Pounds 13% Blood.....	N=	9	—	28.6	36.4	—	32.5
	150 Pounds 14% Acid Phosphate.....	P=	21	—				
	22.5 Pounds 20% Manure Salt.....	K=	—	4.5				
12 <sup>2</sup>	103.8 Pounds 13% Blood.....	$\frac{1}{2}$ N=	13.5	—	25.7	37.0	—	31.35
	225 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	31.5	—				
	33.7 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	—	6.7				
13 <sup>2</sup>	138.4 Pounds 13% Blood.....	$\frac{1}{2}$ N=	18	—	25.6	40.8	—	33.2
	300 Pounds 14% Acid Phosphate.....	2 P=	42	—				
	45 Pounds 20% Manure Salt.....	2 K=	—	9				
14 <sup>2</sup>	207.6 Pounds 13% Blood.....	3 N=	27	—	20.8	32.9	—	26.85
	450 Pounds 14% Acid Phosphate.....	3 P=	63	—				
	67.5 Pounds 20% Manure Salt.....	3 K=	—	13.5				

RESULTS IN FIELD A

					1905	1907	1909	Ave.
7 <sup>2</sup>	Untertilized.....	O=	—	—	23.4	26.5	12.0	20.6
7	Untertilized.....	O=	—	—	27.3	32.5	13.0	24.26
10	69.2 Pounds 13% Blood.....	N=	9	—	23.6	31.2	20.2	25.0
	150 Pounds 14% Acid Phosphate.....	P=	21	—				
	22.5 Pounds 20% Manure Salt.....	K=	—	4.5				
8 <sup>2</sup>	103.8 Pounds 13% Blood.....	$\frac{1}{2}$ N=	13.5	—	29.0	29.3	24.1	27.46
	225 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	31.5	—				
	33.7 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	—	6.7				
9 <sup>2</sup>	138.4 Pounds 13% Blood.....	2 N=	18	—	28.0	34.3	29.0	30.4
	300 Pounds 14% Acid Phosphate.....	2 P=	42	—				
	45 Pounds 20% Manure Salt.....	2 K=	—	9				
10 <sup>2</sup>	207.6 Pounds 13% Blood.....	3 N=	27	—	28.7	35.0	29.7	31.13
	450 Pounds 14% Acid Phosphate.....	3 P=	63	—				
	67.5 Pounds 20% Manure Salt.....	3 K=	—	13.5				
8 <sup>3</sup>	Untertilized.....	O=	—	—	23.1	25.9	18.6	22.5
11 <sup>3</sup>	34.6 Pounds 13% Blood.....	$\frac{1}{2}$ N=	4.5	—	22.0	27.1	25.3	24.8
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5	—				
	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	—	2.2				



adjoining. Not only do the results indicate this but the soil of this plat appears more productive.

In general the results indicate that for corn, potash either in large or small amounts just about pays for itself.

# EFFECT OF VARYING QUANTITIES OF FERTILIZER ON YIELD.

IN 1903 AND 1904.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
	1903	1904	1909	Ave.						
8 <sup>2</sup>	2758	1707	-----	2233	-----	-----	\$-----	\$-----	\$-----	\$-----
11 <sup>2</sup>	2235	1387	-----	1811	— .7	—422	—2.18	1.68	—3.86	—2.17
1 <sup>2</sup>	3120	1969	-----	2545	3.2	205	3.06	3.36	— .30	—1.12
12 <sup>2</sup>	2468	2031	-----	2250	4.95	17	3.53	5.04	—1.51	—1.58
13 <sup>2</sup>	2728	1775	-----	2252	6.8	19	4.84	6.72	—1.88	—1.96
14 <sup>2</sup>	2248	1705	-----	1977	.45	—256	— .71	10.08	—10.79	—9.77

IN 1905, 1907 AND 1909.

	1905	1907	1909	Ave.						
7 <sup>2</sup>	2005	1015	840	1287	-----	-----	-----	-----	-----	-----
7	2275	1410	1520	1735	-----	-----	-----	-----	-----	-----
10	2635	1145	1800	1860	.7	125	.99	3.36	—2.37	—2.87
8 <sup>2</sup>	2760	1525	2025	2103	6.9	816	8.07	5.04	3.03	— .21
9 <sup>2</sup>	2625	1685	2375	2228	9.8	941	10.62	6.72	3.90	.14
10 <sup>2</sup>	2925	1840	2570	2445	10.53	1158	12.00	10.08	1.92	—2.71
8 <sup>3</sup>	1770	1055	2015	1613	-----	-----	-----	-----	-----	-----
11 <sup>3</sup>	1950	1270	2240	1820	2.3	207	2.44	1.68	.76	— .07

TABLE V—  
RESULTS IN FIELD B

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1906	1908	1909	Ave.
5 <sup>2</sup>	Unfertilized.....	O=			14.6	9.6		12.1
4 <sup>2</sup>	34.6 Pounds 13% Blood.....	$\frac{1}{2}$ N=	4.5		13.8	14.5		14.2
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5					
	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	2.2					
13	Unfertilized.....	O=			16.6	15.1		15.9
11	69.2 Pounds 13% Blood.....	N=	9		19.3	19.0		19.2
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
6 <sup>2</sup>	103.8 Pounds 13% Blood.....	$1\frac{1}{2}$ N=	13.5		17.4	17.3		17.35
	225 Pounds 14% Acid Phosphate.....	$1\frac{1}{2}$ P=	31.5					
	33.7 Pounds 20% Manure Salt.....	$1\frac{1}{2}$ K=	6.7					
7 <sup>2</sup>	138.4 Pounds 13% Blood.....	2 N=	18		18.2	21.6		19.9
	300 Pounds 14% Acid Phosphate.....	2 P=	42					
	45 Pounds 20% Manure Salt.....	2 K=	9					
8 <sup>2</sup>	173 Pounds 13% Blood.....	$2\frac{1}{2}$ N=	22.5		25.2	26.5		25.85
	375 Pounds 14% Acid Phosphate.....	$2\frac{1}{2}$ P=	52.5					
	56.2 Pounds 20% Manure Salt.....	$2\frac{1}{2}$ K=	11.2					

## AVERAGE RESULTS FOR SEVEN YEARS

					Ave.			
8 <sup>2</sup> -8 <sup>3</sup> -5 <sup>2</sup>	Unfertilized.....	O=						20.6
11 <sup>2</sup> -11 <sup>3</sup> -4 <sup>2</sup>	34.6 Pounds 13% Blood.....	$\frac{1}{2}$ N=	4.5					22.0
	75 Pounds 14% Acid Phosphate.....	$\frac{1}{2}$ P=	10.5					
	11.2 Pounds 20% Manure Salt.....	$\frac{1}{2}$ K=	2.2					
8 <sup>2</sup> -7-13	Unfertilized.....	O=						23.3
12-10-11	69.2 Pounds 13% Blood.....	N=	9					25.5
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
12 <sup>2</sup> -8 <sup>2</sup> -6 <sup>2</sup>	103.8 Pounds 13% Blood.....	$1\frac{1}{2}$ N=	13.5					25.7
	225 Pounds 14% Acid Phosphate.....	$1\frac{1}{2}$ P=	31.5					
	33.7 Pounds 20% Manure Salt.....	$1\frac{1}{2}$ K=	6.7					
8 <sup>2</sup> -7 <sup>2</sup> -(5 <sup>2</sup> +13)	Unfertilized.....	O=						20.1
13 <sup>2</sup> -9 <sup>2</sup> -	138.4 Pounds 13% Blood.....	2 N=	18					28.2
	300 Pounds 14% Acid Phosphate.....	2 P=	42					
	45 Pounds 20% Manure Salt.....	2 K=	9					
8 <sup>2</sup> -7 <sup>2</sup> -(5 <sup>2</sup> +13 <sup>2</sup> )	Unfertilized.....	O=						20.2
14 <sup>2</sup> -10 <sup>2</sup> -8 <sup>2</sup> *	207.6 Pounds 13% Blood.....	3 N=	27					28.4
	450 Pounds 14% Acid Phosphate.....	3 P=	63					
	67.5 Pounds 20% Manure Salt.....	3 K=	13.5					

\*2½ NPK in 1906 and 1908.

Continued.

IN 1906 AND 1908.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer.	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.88 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Val- uing Stover) Over Cost of Fertilizer
	1906	1908	1909	Ave.						
5 <sup>2</sup>	1733	1038	-----	1386	-----	-----	\$-----	\$-----	\$-----	\$-----
4 <sup>2</sup>	1795	1498	-----	1647	2.1	261	2.51	1.68	.83	— .21
13	1690	1207	-----	1449	-----	-----	-----	-----	-----	-----
11	2493	1638	-----	2066	3.3	617	4.78	3.36	1.42	—1.05
6 <sup>2</sup>	1978	1808	-----	1893	4.8	448	5.15	5.04	.11	—1.68
7 <sup>2</sup>	2720	2408	-----	2564	6.9	1061	9.07	6.72	2.35	—1.89
8 <sup>2</sup>	2810	2570	-----	2690	12.4	1129	13.20	8.40	4.80	.28

IN "OLD FIELD" AND IN FIELDS A AND B.

	Ave.							
8 <sup>2</sup> -8 <sup>2</sup> -5 <sup>2</sup>	1725	-----	-----	-----	-----	-----	-----	-----
11 <sup>2</sup> -11 <sup>2</sup> -4 <sup>2</sup>	1768	1.4	43	1.15	1.68	— .53	— .70	-----
8 <sup>2</sup> -7-13	1826	-----	-----	-----	-----	-----	-----	-----
1 <sup>2</sup> -10-11	2115	2.2	282	2.69	3.36	— .67	—1.82	-----
12 <sup>2</sup> -8 <sup>2</sup> -6 <sup>2</sup>	2085	5.7	483	5.92	5.04	.88	—1.05	-----
8 <sup>2</sup> -7 <sup>2</sup> -(5 <sup>2</sup> +13)	1619	-----	-----	-----	-----	-----	-----	-----
13 <sup>2</sup> -9 <sup>2</sup> (5 <sup>2</sup> +13 <sup>2</sup> )	2331	8.1	712	8.52	6.72	1.80	—1.05	-----
8 <sup>2</sup> -7 <sup>2</sup> (5 <sup>2</sup> +13 <sup>2</sup> )	1636	-----	-----	-----	-----	-----	-----	-----
14 <sup>2</sup> -10 <sup>2</sup> -8 <sup>2</sup>	2381	8.2	745	8.72	9.60	— .88	—3.56	-----

## EFFECT OF VARYING QUANTITIES OF FERTILIZER ON YIELD.

The tests in Table 5 were arranged to show the effect of increasing and decreasing the normal fertilizer application on yields, the normal (N P K) being 300 pounds of a mixture containing 7 per cent phosphoric acid, 3 per cent nitrogen and  $1\frac{1}{2}$  per cent potash. The applications were at the rate of 150 pounds per acre  $\frac{1}{2}$  (N P K); 300 pounds per acre (N P K); 450 pounds per acre  $1\frac{1}{2}$  (N P K); 600 pounds per acre 2 (N P K); 750 pounds per acre  $2\frac{1}{2}$  (N P K); and 900 pounds per acre 3 (N P K). The results in all the fields show increased yields for all the quantities of fertilizer. The amount varied from 150 pounds to 900 pounds per acre.

As an average on the three fields for seven years, the increased application of fertilizer gradually increased the yields. With corn this increase was not enough to pay for the fertilizer when the grain alone was considered, and the heaviest application gave the greatest loss. When the stover was taken into consideration, the one and one-half and two times applications gave small profits. In general the results indi-

TABLE VI.—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN SHOWING THE EFFECT

Number of Plot	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid ( $P_2O_5$ ) Per Acre	Pounds of Potash ( $K_2O$ ) Per Acre	RESULTS IN "OLD FIELD"		
					Yield in Bushels of Shelled Corn Per Acre		
					1903	1904	Ave.
8 <sup>2</sup>	Unfertilized.....	O=			23.9	29.9	26.4
15 <sup>2</sup>	34.6 Pounds 13% Blood at planting.....	$\frac{1}{2}$ N= 4.5			12.3	30.5	21.4
	30.4 Pounds 14.8% Nitrate of Soda about July 1.....	$\frac{1}{2}$ N= 4.5					
	150 Pounds 14% Acid Phosphate.....	P=	21				
	22.5 Pounds 20% Manure Salt.....	K=		4.5			
13 <sup>3</sup>	30.4 Pounds 14.8% Nitrate of Soda at planting.....	$\frac{1}{2}$ N= 4.5			17.5	26.6	22.1
	30.4 Pounds 14.8% Nitrate of Soda about July 1.....	$\frac{1}{2}$ N= 4.5					
	150 Pounds 14% Acid Phosphate.....	P=	21				
	22.5 Pounds 20% Manure Salt.....	K=		4.5			
23 <sup>3</sup>	34.6 Pounds 13% Blood at planting.....	$\frac{1}{2}$ N= 4.5			25.3	31.0	28.2
	150 Pounds 14% Acid Phosphate.....	P=	21				
	22.5 Pounds 20% Manure Salt.....	K=		4.5			
	Unfertilized.....	O=					
6 <sup>3</sup>	Unfertilized.....	O=			21.3	25.6	23.5
3 <sup>3</sup>	55.4 Pounds 13% Blood applied at planting.....	4-5N= 7.2			25.3	31.4	28.4
	12.2 Pounds 14.8% Nitrate of Soda applied at planting.....	1-5N= 1.8					
	150 Pounds 14% Acid Phosphate.....	P=	21				
	22.5 Pounds 20% Manure Salt.....	K=		4.5			

cate that a complete commercial fertilizer with the composition 7-3-11½ cannot be applied with much profit to Norfolk sandy loam.

Concisely, the average results for seven years' experiments with varying quantities of fertilizer are as follows:

Pounds Fertilizer Per Acre	Average Yield Per Acre		Average Increase Over Unfertilized Plots Per Acre		Average Value of Increase Over Cost of Fertilizer	
	Corn Bushels	Stover Pounds	Corn Bushels	Stover Pounds	Corn 70 cts. Per Bu.	Stover \$.00 Per Ton
150	22.0	1768	1.4	43	\$ -0.53	\$ -0.70
300	25.5	2115	2.2	282	-0.67	-1.82
450	25.7	2085	5.7	483	0.88	-1.05
600	28.2	2331	8.1	712	1.80	-1.05
750 <sup>1</sup>	25.9	2690	12.4	1129	4.80	0.28
900 <sup>2</sup>	29.4	2258	6.5	592	-3.16	-5.53

<sup>1</sup>Average for two years.

<sup>2</sup>Average for five years.

#### OF DIFFERENT MATERIALS FURNISHING NITROGEN AND TIME OF APPLICATION.

IN 1903 AND 1904.

Number of Plot	Yield of Stover in Pounds Per Acre			Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Val- uing Stover) Over Cost of Fertilizer
	1903	1904	Ave.						
8 <sup>2</sup>	2758	1707	2233	-----	-----	\$-----	\$-----	\$-----	\$-----
15 <sup>2</sup>	1418	1636	1527	-5.0	-706	-7.72	2.99	-10.73	-6.49
1 <sup>3</sup>	1868	1706	1787	-1.4	-203	-1.79	2.75	-4.54	-3.73
2 <sup>3</sup>	3398	1998	2698	4.7	708	6.12	3.23	2.89	.06
6 <sup>3</sup>	2215	1764	1990	-----	-----	-----	-----	-----	-----
3 <sup>3</sup>	2145	2199	2172	4.9	182	4.16	3.15	1.01	.28

TABLE VI—  
RESULTS IN FIELD A

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1905	1907	1909	Ave.
9 <sup>2</sup>	Unfertilized.....	O=			23.4	26.5	12.0	20.6
11 <sup>2</sup>	34.6 Pounds 13% Blood applied at planting...½ N=	4.5			26.3	29.6	22.8	26.2
	30.4 Pounds 14.8% Nitrate of Soda applied about July 1.....½ N=	4.5						
	150 Pounds 14% Acid Phosphate.....P=		21					
	22.5 Pounds 20% Manure Salt.....K=			4.5				
12 <sup>2</sup>	30.4 Pounds 14.8% Nitrate of Soda applied at planting.....½ N=	4.5			20.0	23.1	23.6	22.2
	30.4 Pounds 14.8% Nitrate of Soda applied about July 1.....½ N=	4.5						
	150 Pounds 14% Acid Phosphate.....P=		21					
	22.5 Pounds 20% Manure Salt.....K=			4.5				
13 <sup>2</sup>	34.6 Pounds 13% Blood applied at planting...½ N=	4.5			28.5	30.1	33.3	30.6
	34.6 Pounds 13% Blood applied about July 1...½ N=	4.5						
	150 Pounds 14% Acid Phosphate.....P=		21					
	22.5 Pounds 20% Manure Salt.....K=			4.5				
*1 <sup>3</sup>	55.4 Pounds 13% Blood applied at planting...4-5N=	7.2			18.5	24.5	12.6	18.5
	12.2 Pounds 14.8% Nitrate of Soda applied at planting.....1-5N=	1.8						
	150 Pounds 14% Acid phosphate.....P=		21					
8 <sup>3</sup>	22.5 Pounds 20% Manure Salt.....K=			4.5	23.1	25.9	18.6	22.5
	Unfertilized.....	O=						

RESULTS IN FIELD B

					1906	1908	Ave.
13 <sup>2</sup>	Unfertilized.....	O=			18.1	13.3	15.7
9 <sup>2</sup>	34.6 Pounds 13% Blood applied at planting...½ N=	4.5			20.8	22.2	21.5
	30.4 Pounds 14.8% Nitrate of Soda applied about July 1.....½ N=	4.5					
	150 Pounds 14% Acid Phosphate.....P=		21				
	22.5 Pounds 20% Manure Salt.....K=			4.5			
10 <sup>2</sup>	30.4 Pounds 14.8% Nitrate of Soda applied at planting.....½ N=	4.5			21.9	24.0	23.0
	30.4 Pounds 14.8% Nitrate of Soda applied about July 1.....½ N=	4.5					
	150 Pounds 14% Acid Phosphate.....P=		21				
	22.5 Pounds 20% Manure Salt.....K=			4.5			
11 <sup>2</sup>	34.6 Pounds 13% Blood applied at planting...½ N=	4.5			23.5	22.5	23.0
	34.6 Pounds 13% Blood applied about July 1...½ N=	4.5					
	150 Pounds 14% Acid Phosphate.....P=		21				
	22.5 Pounds 20% Manure Salt.....K=			4.5			
12 <sup>2</sup>	55.4 Pounds 13% Blood applied at planting...4-5N=	7.2			20.4	20.3	20.4
	12.2 Pounds 14.8% Nitrate of Soda applied at planting.....1-5N=	1.8					
	150 Pounds 14% Acid Phosphate.....P=		21				
	22.5 Pounds 20% Manure Salt.....K=			4.5			

\*This plat is not as good naturally as the other plats of the series used in making the comparisons. The top soil has been washed off to a considerable extent, as they are located on the most elevated portion of the field.

*Continued.*

IN 1905, 1907 AND 1909.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Val- uing Stover) Over Cost of Fertilizer
	1905	1907	1909	Ave.						
9 <sup>2</sup>	9005	1015	840	1287	-----	-----	\$-----	\$-----	\$-----	\$-----
11 <sup>2</sup>	2250	1205	1860	1772	5.6	485	5.86	2.98	2.88	.94
12 <sup>2</sup>	1940	1490	2260	1897	1.6	610	3.50	2.72	.84	-1.60
13 <sup>2</sup>	2193	1520	2415	2043	10.0	756	10.02	3.31	6.71	3.69
*1 <sup>3</sup>	1745	1445	1400	1530	-4.0	-83	-3.13	3.14	-6.27	-5.94
8 <sup>3</sup>	1770	1055	2015	1613	-----	-----	-----	-----	-----	-----

IN 1906 AND 1908.

	1906	1908	Ave							
13 <sup>2</sup>	-----	2280	1428	1854	-----	-----	-----	-----	-----	-----
9 <sup>2</sup>	-----	2035	2218	2127	7.6	507	7.35	3.04	4.31	2.28
10 <sup>2</sup>	-----	2250	2148	2199	8.7	521	8.17	2.78	5.39	3.31
11 <sup>2</sup>	-----	2435	2153	2294	8.2	557	7.97	3.30	4.68	2.44
12 <sup>2</sup>	-----	2260	2306	2283	5.2	488	5.59	3.21	2.38	.43

TABLE VI—

AVERAGE RESULTS FOR SEVEN YEARS

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre		
							Ave.
8 <sup>2</sup> -9 <sup>2</sup> -13 <sup>2</sup>	Untertitized.....	O=					20.87
15 <sup>2</sup> -11 <sup>2</sup> -9 <sup>2</sup>	34.6 Pounds 13% Blood applied at planting..... <sup>1</sup> / <sub>2</sub> N=	4.5					
	30.4 Pounds 14.8% Nitrate of Soda applied about July 1..... <sup>1</sup> / <sub>2</sub> N=	4.5					
	150 Pounds 14% Acid Phosphate.....	P=	21				23.50
	22.5 Pounds 20% Manure Salt.....	K=		4.5			
6 <sup>3</sup> -9 <sup>2</sup> -13 <sup>2</sup>	Untertitized.....	O=					20.02
1 <sup>3</sup> -12 <sup>2</sup> -10 <sup>2</sup>	30.4 Pounds 14.8% Nitrate of Soda applied at planting..... <sup>1</sup> / <sub>2</sub> N=	4.5					
	30.4 Pounds 14.8% Nitrate of Soda applied about July 1..... <sup>1</sup> / <sub>2</sub> N=	4.5					
	150 Pounds 14% Acid Phosphate.....	P=	21				23.81
	22.5 Pounds 20% Manure Salt.....	K=		4.5			
6 <sup>3</sup> -9 <sup>2</sup> -13 <sup>2</sup>	Untertitized.....	O=					20.02
2 <sup>3</sup> -13 <sup>2</sup> -11 <sup>2</sup>	34.6 Pounds 13% Blood applied at planting..... <sup>1</sup> / <sub>2</sub> N=	4.5					
	34.6 Pounds 13% Blood applied about July 1..... <sup>1</sup> / <sub>2</sub> N=	4.5					
	150 Pounds 14% Acid Phosphate.....	P=	21				27.74
	22.5 Pounds 20% Manure Salt.....	K=		4.5			
6 <sup>3</sup> -8 <sup>2</sup> -13 <sup>2</sup>	Untertitized.....	O=					20.84
3 <sup>3</sup> -1 <sup>3</sup> -12 <sup>2</sup>	55.4 Pounds 13% Blood applied at planting..... <sup>4</sup> -5N=	7.2					
	12.2 Pounds 14.8% Nitrate of Soda applied at planting..... <sup>1</sup> -5N=	1.8					
	150 Pounds 14% Acid Phosphate.....	P=	21				21.85
	22.5 Pounds 20% Manure Salt.....	K=		4.5			

### EFFECT OF DIFFERENT MATERIALS FURNISHING NITROGEN AND TIME OF APPLICATION.

The test, the results of which are presented in Table 6 were planned to determine the comparative value of dried blood and nitrate of soda as nitrogen-furnishing materials in growing corn, as well as the best way to apply them.

Nitrate of soda is one of the best, if not the best, representative of quickly acting nitrogenous materials. Because of its easy solubility in water and the form of its nitrogen, it is quickly available for the use of plants. The question usually raised in connection with its use is with reference to the possibility of its loss from the soil, especially in sandy or open, porous soil, its easy solubility in water, and of its giving



*Continued.*

IN "OLD FIELD" AND IN FIELDS A AND B.

Number of Plat	Yield of Stover in Pounds Per Acre		Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer.	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$ .70 Per Bushel and Stover at \$8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
		Ave.						
8 <sup>2</sup> -9 <sup>2</sup> -13 <sup>2</sup>		1919			\$	\$	\$	\$
15 <sup>2</sup> -11 <sup>2</sup> -9 <sup>2</sup>		1803	2.63	84	2.18	3.08	— .90	—1.24
6 <sup>3</sup> -9 <sup>2</sup> -13 <sup>2</sup>		1649						
1 <sup>2</sup> -12 <sup>2</sup> -10 <sup>2</sup>		1951	3.79	302	3.86	2.80	1.06	— .15
6 <sup>3</sup> -9 <sup>2</sup> -13 <sup>2</sup>		1649						
2 <sup>3</sup> -13 <sup>2</sup> -11 <sup>2</sup>		2302	7.72	653	8.02	3.36	4.66	2.04
6 <sup>3</sup> -8 <sup>2</sup> -13 <sup>2</sup>		1789						
3 <sup>2</sup> -1 <sup>3</sup> -12 <sup>2</sup>		1927	1.01	138	1.05	3.25	—2.20	—2.54

out before a long seasoned crop has made its growth, thus leaving the crop without a supply of nitrogen before the end of the growing season. Its use is most strongly advocated for short-season crops, as in early truck and vegetable growing and as a top dressing for grain and corn and cotton after growth is well advanced, or for any crop when seen to be in need of a quickly-acting nitrogen supplying material.

Dried blood, which is a fair representative of the animal and vegetable materials furnishing nitrogen, such as tankage, cotton-seed meal, etc., is not soluble in water like nitrate and hence acts more slowly and for a longer time. It must be changed by rotting in the soil into nitrate before it can feed the crop, and is thus likely to be effective throughout a reasonable growing season.

It has become a practice in growing many crops to apply only a part of the nitrogen at time of planting and a portion later, usually as nitrate of soda, so as to keep the crop growing as rapidly as possible.

The experiments in Table 6 were planned with a view of throwing as much light as possible on these questions of nitrogen fertilization in corn growing. In the tests all of the phosphoric acid and potash were applied in the drill before planting.

On three plats 15<sup>2</sup>, 11<sup>2</sup>, and 9<sup>2</sup> one-half the nitrogen was supplied as dried blood and was applied with the phosphoric acid and potash before planting, the other half of the nitrogen being supplied as nitrate of soda and was applied about July 1. On three other plats 1<sup>3</sup>, 12<sup>2</sup> and 10<sup>2</sup>, all of the nitrogen was supplied by nitrate of soda, one-half being applied before planting with phosphoric acid and potash, and the other half about July 1. On still three other plats 2<sup>3</sup>, 13<sup>2</sup>, and 11<sup>2</sup>, the nitrogen was supplied by dried blood, one-half being applied before planting, with the phosphoric acid and potash, and the other half about July 1. On three more plats 3<sup>3</sup>, 1<sup>3</sup> and 12<sup>2</sup>, four-fifths of the nitrogen was furnished by dried blood and one-fifth by nitrate of soda,

TABLE VII—RESULTS OF FERTILIZER EXPERIMENTS WITH CORN; SHOWING

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	RESULTS IN "OLD FIELD"		
					Yield in Bushels of Shelled Corn Per Acre		
					1903	1904	Ave.
8 <sup>2</sup>	Unfertilized.....	O=			22.9	29.9	26.4
1 <sup>2</sup>	69.2 Pounds 13% Blood.....	N=	9		28.6	36.4	32.5
	150 Pounds 14% Acid Phosphate.....	P=	21				
	22.5 Pounds 20% Manure Salt.....	K=	4.5				
	Fertilizer applied in drill before planting.						
6 <sup>3</sup>	Unfertilized.....	O=			21.3	25.6	23.5
9 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9		15.2	27.7	21.5
	150 Pounds 14% Acid Phosphate.....	P=	21				
	22.5 Pounds 20% Manure Salt.....	K=	4.5				
	The fertilizer on this plat was divided into two equal parts, ½ being applied in the drill before planting, and ½ as side dressing about July 1.						
8 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9		19.9	32.0	26.
	150 Pounds 14% Acid Phosphate.....	P=	21				
	22.5 Pounds 20% Manure Salt.....	K=	4.5				
	The fertilizer on this plat was applied broadcast before planting.						

and was all applied before planting, along with the phosphoric acid and potash.

As an average of the results of the three fields, the best paying results were secured by dividing the nitrogen application. One-half was put in as blood at planting together with all of the phosphoric acid and potash, and reserving the remaining half of the nitrogen to be applied as blood alongside the corn plants about July 1. In Field B, which is probably the most uniform field, there was but little difference between the profit per acre from the following carriers of nitrogen applied in the ways indicated, with the phosphoric acid and potash put in at planting: (1) By dividing the nitrogen application, putting one-half in as blood at planting and the other half as nitrate alongside the rows about July 1; (2) by having all the nitrogen derived from nitrate of soda, applying one-half at planting and the other half about July 1; and (3) by having all the nitrogen supplied by blood, one-half going in at planting and the other half as a side dressing about July 1.

#### THE EFFECTS OF DIFFERENT METHODS AND TIME OF APPLICATION.

IN 1903 AND 1904.

Number of Plat	Yield of Stover in Pounds Per Acre			Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer.	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
	1903	1904	Ave.						
8 <sup>2</sup>	2758	1707	2233			\$	\$	\$	\$
1 <sup>2</sup>	3120	1969	2545	6.1	312	55 2	3.36	2.16	0.91
6 <sup>3</sup>	2215	1764	1990						
9 <sup>3</sup>	1375	1833	1604	-2.0	-386	-2.94	3.33	-6.17	-4.77
8 <sup>3</sup>	2060	1747	1904	2.5	-86	1.41	3.23	-1.82	-1.48

TABLE VII—

## RESULTS IN FIELD A

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1905	1907	1909	Ave.
7	Unfertilized.....	O=			27.3	32.5	13.0	24.3
10	69.2 Pounds 13% Blood.....	N=	9		23.6	31.2	20.2	25.
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	Fertilizer applied in drill before planting.							
8 <sup>3</sup>	Unfertilized.....	O=			23.1	25.9	18.6	22.5
4 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9		23.9	28.6	20.0	24.2
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	The fertilizer on this plat was divided into two equal parts, ½ being applied in the drill before planting, ½ as side dressing about July 1.							
9 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9		24.1	29.7	24.4	26.1
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	The fertilizer on this plat was applied broadcast before planting.							

## RESULTS IN FIELD B

					1906	1908		Ave.
13	Unfertilized.....	O=			16.6	15.1		15.85
11	69.2 Pounds 13% Blood.....	N=	9		19.3	19.0		19.2
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	Fertilizer applied in drill before planting.							
1 <sup>3</sup>	Unfertilized.....	O=			13.3	7.6		10.5
4 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9		19.7	13.4		16.6
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	The fertilizer on these plats was divided into two equal parts, ½ being applied in the drill before planting and ½ as side dressing about July 1.							
7 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9		19.2	14.8		17.
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	The fertilizer on these plats was applied broadcast before planting.							

Continued.

IN 1905, 1907 AND 1909.

Number of Plat	Yield of Stover in Pounds Per Acre				Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
	1905	1907	1909	Ave.						
7	2275	1410	1520	1735	-----	-----	\$-----	\$-----	\$-----	\$-----
10	2635	1145	1800	1860	.7	125	.99	3.36	-2.37	-2.87
8 <sup>3</sup>	1770	1055	2015	1613	-----	-----	-----	-----	-----	-----
4 <sup>3</sup>	2013	1525	2020	1853	1.7	240	2.15	3.31	-1.16	-2.12
9 <sup>3</sup>	2000	1695	2055	1917	3.6	304	3.74	3.31	.43	-1.79

IN 1906 AND 1908.

	1906	1908		Ave.						
13	1690	1207	-----	1449	-----	-----	-----	-----	-----	-----
11	2493	1638	-----	2066	3.3	617	4.78	3.36	1.42	-1.05
1 <sup>3</sup>	1530	875	-----	1203	-----	-----	-----	-----	-----	-----
4 <sup>3</sup>	1860	875	-----	1368	6.1	165	4.93	3.30	1.63	1.17
7 <sup>3</sup>	2000	1680	-----	1840	6.5	637	7.10	3.30	3.80	1.25

TABLE VII—

AVERAGE FOR SEVEN YEARS

Number of Plat	Fertilizer Application Per Acre	Pounds of Nitrogen (N) Per Acre	Pounds of Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> ) Per Acre	Pounds of Potash (K <sub>2</sub> O) Per Acre	Yield in Bushels of Shelled Corn Per Acre			
					1903	1904	1906	Ave.
8 <sup>2</sup> -7-13	Unfertilized.....	O=						22.5
1 <sup>2</sup> -10-11	69.2 Pounds 13% Blood.....	N=	9					
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	Fertilizer applied in drill before planting.							28.32
6 <sup>3</sup> -8 <sup>3</sup> -1 <sup>3</sup>	Unfertilized.....	O=						19.34
9 <sup>3</sup> -4 <sup>3</sup> -4 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9					
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	The fertilizer on these plats was divided into two equal parts, $\frac{1}{2}$ being applied in the drill before planting, and $\frac{1}{2}$ as side dressing about July 1.							21.21
6 <sup>3</sup> -8 <sup>3</sup> -1 <sup>3</sup>	Unfertilized.....	O=						19.34
8 <sup>3</sup> -9 <sup>3</sup> -7 <sup>3</sup>	69.2 Pounds 13% Blood.....	N=	9					
	150 Pounds 14% Acid Phosphate.....	P=	21					
	22.5 Pounds 20% Manure Salt.....	K=	4.5					
	The fertilizer on these plats was applied broadcast before planting.							23.44

### EFFECT OF DIFFERENT METHODS AND TIME OF APPLICATION OF FERTILIZER.

The results presented in Table 7 were obtained from tests planned to show the effect on the yield of corn and stover from applying—

(a) All the fertilizer in the drill before planting;

(b) Dividing the fertilizer into two equal parts, applying one-half in the drill before planting, and the other half as a side dressing about July first; and

(c) From applying all the fertilizer broadcast before planting, the quantity of fertilizer and the materials entering into it being the same in all cases.

Taking the results as a whole, the application of all the fertilizer in the drill before planting produced the largest increase 5.8 bushels—the broadcast application came next with a gain of 4.1 bushels, and the double application last with an increase of only 1.87 bushels of corn. In the case of Fields A and B broadcasting gave better returns than either of the other methods of application, but for the two years average on "Old" Field the drill application proved best. However, the average results failed to show a large enough increase in favor of any one

*Continued.*

IN "OLD FIELD" AND IN FIELDS A AND B.

Number of Plat	Yield of Stover in Pounds Per Acre		Average Increase in Bushels of Shelled Corn Per Acre Due to Fertilizer	Average Increase in Pounds of Stover Per Acre Due to Fertilizer	Value of Increase with Corn at \$.70 Per Bushel and Stover at \$.8 Per Ton	Cost of Fertilizer Per Acre	Value of Average Annual Increase of Corn and Stover Over Cost of Fertilizer	Value of Average Annual Increase of Corn Alone (Not Valuing Stover) Over Cost of Fertilizer
		Ave.						
8 <sup>2</sup> -7-13		1796			\$	\$	\$	\$
1 <sup>2</sup> -10-11		2114	5.8	318	6.23	3.36	1.97	0.70
6 <sup>2</sup> -8 <sup>2</sup> -1 <sup>3</sup>		1603						
9 <sup>2</sup> -1 <sup>3</sup> -4 <sup>3</sup>		1643	1.87	40	1.47	3.36	-1.89	-2.05
6 <sup>2</sup> -8 <sup>2</sup> -1 <sup>3</sup>		1603						
8 <sup>2</sup> -9 <sup>2</sup> -7 <sup>3</sup>		1879	4.10	276	3.97	3.36	.61	— .49

method to warrant its recommendation. It is fair to conclude that two applications of the amount of fertilizer used in the experiments could not be expected to give enough additional profit over one application to pay. In this experiment the fertilizer was applied at the rate of 300 pounds per acre. It is very probable that if larger amounts were used, two applications and broadcasting would give larger yields than drilling the fertilizer.

## 2. VARIETIES, CULTURE, AND FERTILIZATION OF CORN ON COASTAL PLAIN SANDY LOAM SOILS.

Experiments have been conducted for fifteen years with varieties of corn on the sandy loam soil of the Edgecombe Test Farm. These results have been given in detail in the bulletins of this Department. On basis of these results and other information which we have, the suggestions below are given for the culture and fertilization of corn on the sandy and sandy loam soils of the Coastal Plain Region and the varieties of corn which are best suited to them.

Corn is an exhaustive crop on the soil, especially so when the stover is also removed. On basis of present prices of fertilizer one bushel of

corn removes from the soil about 20 cents worth of plant food. It would cost this much to return the plant food in a bushel of corn to the soil in a commercial fertilizer. A fifty-bushel crop of corn has, therefore, removed plant food to the value of about \$10. By good fertilization we have produced good yields, and increases over unfertilized areas have been obtained at a moderate cost per bushel.

**PREPARATION AND CULTIVATION.**—Corn delights in a thoroughly well prepared soil. The land should be broken in the fall or early spring to a depth of 6 or 8 inches and the soil may be gradually deepened beyond this to advantage. Before planting cut up the land with a disk harrow to get rid of clods and to make a good seed bed. Four feet is a good width for rows. The distance the corn is left in the row would depend on the productiveness of the land and should vary, usually, between 15 and 30 inches. The fertilizer on these soils should, as a rule, be put in the drill before planting and the corn planted just below the level. Weeders and light harrows may be run across the rows two or three times before and after the corn is up and before cultivation with cultivators begin. Cultivate with good one or two-horse cultivators which will not require more than two furrows to the row. The soil should be stirred every ten days or two weeks, and as nearly as possible after rains so as to keep down grass and weeds and to conserve the supply of moisture. The cultivation should be comparatively deep early in the season, becoming shallow as the crop grows larger and its root system develops. It has been found desirable to continue the cultivation in this way until the corn is in silk and tassel, making the cultivation very shallow at last and going away some distance from the corn.

**VARIETIES.**—In the fifteen years' work on the Edgcombe Farm a very large number of varieties of corn, embracing practically all the types generally grown, have been tested. Those giving the best results are the ones belonging to the prolific or two or more ears-to-the-stalk kind. Among these Weekley's Improved, Cocke's Prolific, Biggs' Seven Ear and Hickory King have done specially well. The results of variety tests have been published each year in detail and the results are summarized in the bulletins of this Department. These results can be had for study by any one interested in them.

**FERTILIZATION.**—Analyses of these soils show that they are very low in phosphoric acid, high in potash, and have a fair supply of lime, the quantity of nitrogen depending on the amount of vegetable or organic matter in the soil. Experiments show that nitrogen is the one single constituent most needed for the production of corn on these lands; phosphoric acid and potash coming next but neither one showing any marked yields when used in different amounts. It is not possible with present results to say just exactly what is the best proportion of these constituents to use for most profitable returns, but it is certain from the analyses of the soil and the field results that the fertilizer should carry a high percentage of nitrogen and phosphoric acid and a low percentage



of potash. Indications are that a mixture containing 6 per cent available phosphoric acid, 6 per cent nitrogen and 1 to 2 per cent potash will give close to if not the best returns. Six per cent nitrogen is equal to 7.3 per cent ammonia. This mixture can be usually used at the rate of 100 to 300 pounds per acre with fairly good returns and profits. Large quantities cannot as a general thing be recommended for eastern soils.

The nitrogen may be all derived from blood, tankage, cotton-seed meal or similar products, or in part from one or all of these and in part from nitrate of soda or sulphate of ammonia. Nitrate of soda may be used as the entire source of nitrogen when divided into two parts.

Kainit, manure salt, sulphate or muriate of potash may furnish the potash, and acid phosphate the phosphoric acid.

One hundred pounds of the above mixture would contain 6 pounds of available phosphoric acid, 1 to 2 pounds of potash and 6 pounds of nitrogen; and 300 pounds would contain 18 pounds of available phosphoric acid, 3 to 6 pounds of potash and 18 pounds of nitrogen. The required amounts of phosphoric acid in 100 and 300 pounds, respectively, of this mixture would be supplied by 42.9 pounds and 128.6 pounds of 14 per cent acid phosphate; the nitrogen by 46 pounds and 138.4 pounds of 13 per cent dried blood, and the potash by 5 and 10 pounds, and 15 and 30 pounds of manure salt. Other materials or other grades of these materials may be used and it will not be difficult, knowing just what they contain, to use such quantities of them as may be necessary to furnish the desired quantities of plant food, having in mind that it is the specific number of pounds of phosphoric acid, nitrogen, and potash that is desired rather than a given weight of mixed fertilizer.

It is perhaps less difficult to calculate the number of pounds of the three plant foods (N P K) to be applied per acre to any crop from materials on hand than to estimate the exact number of pounds of the material to make a formula of a certain composition, as for example take an 8-2-2 fertilizer. The question of filler does not have to be considered in doing this, as is necessary in making a fertilizer formula in the usual way. When it is desired, for instance, to apply the equivalent of 300 pounds per acre of a fertilizer mixture containing 6 per cent available phosphoric acid, 2 per cent potash and 6 per cent nitrogen, or 18 pounds of phosphoric acid, 6 pounds of potash and 18 pounds of nitrogen, it is only necessary after multiplying by 100 to divide the

number of pounds of plant food desired per acre (18, 18 and 6) by the percentage composition of the materials to be used as follows:

Number of Pounds of Plant Food Per Acre Wanted	÷	Percentage Composition of the Material to be Used	=	Number of Pounds Fertilizer Materials Per Acre to Apply
Phosphoric Acid, 18 lbs.....	÷	14 Per cent Acid Phosphate...	=	128.6
Nitrogen, 18 lbs.....	÷	13 Per cent Dried Blood.....	=	138.5
Potash, 6 lbs.....	÷	20 Per cent Manure Salt.....	=	30.0

The best and most economical way to apply the fertilizer in the quantities recommended here is in the drill before planting, though there is no objection to dividing the application into two equal parts, putting one-half in the drill before planting and applying the other half as a side dressing around July first according to season and growth of crop. The fertilizer in the quantity suggested here should not be applied broadcast.

### LEAF TOBACCO SALES FOR MARCH. 1915.

Pounds sold for producers, first hand .....	1,720,440
Pounds sold for dealers .....	152,565
Pounds sold for warehouses .....	355,295
Total.....	2,228,300

RECEIVED  
MAY 10 1915  
U. S. DEPT. OF AGRICULTURE

**THE BULLETIN**

OF THE

**NORTH CAROLINA**

**DEPARTMENT OF AGRICULTURE,**

**RALEIGH**

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Vol. 36, No. 6.

JUNE, 1915.

Whole No. 209.

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	Pages
Part 1. THE SAN JOSÉ SCALE.....	5 to 26
Remedies for San José Scale.....	18 to 25
Part 2. ORCHARD SPRAYING .....	27 to 50
Part 3. ORCHARD PROTECTION .....	51 to 58

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Post-office at Raleigh, N. C., as second-class matter,  
February 7, 1901, under Act of June 6, 1900.

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‡In cooperation with the Bureau of Plant Industry, United States Department of Agriculture.

## LETTER OF TRANSMITTAL.

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RALEIGH, N. C., May 29, 1915.

HON. W. A. GRAHAM,

*Commissioner of Agriculture.*

SIR:—I submit herewith manuscript for a BULLETIN on "*San José Scale; Orchard Spraying and Orchard Protection*," which is designed to bring into one publication a discussion of the more important points on these subjects that most frequently arise in our correspondence.

This is a revision of the BULLETIN which we issued on the same subject in June, 1912, the edition of which has already been exhausted.

It has always been difficult to keep on hand a supply of literature on the subjects treated in this BULLETIN, and I therefore most earnestly recommend that at least 10,000 copies of this be issued in addition to the number required by the regular mailing-list.

I recommend this for publication as the regular monthly BULLETIN for June, 1915.

Very respectfully,

FRANKLIN SHERMAN, JR.,

*Entomologist.*

# CONTENTS.

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PART 1. THE SAN JOSÉ SCALE (Pages 5 to 26).	PAGE
Introduction .....	5
Appearance of Insect, etc.....	5 to 9
Life-history, etc. ....	9
How it Spreads .....	11 and 12
Plants Infested .....	12 and 13
Abundance and Distribution in North Carolina.....	13 to 15
Natural Enemies of San José Scale.....	16 and 17
History—Where it Came From, etc.....	17
Remedies for San José Scale.....	18 to 21
When to Give the Treatment.....	21
Policy in Regard to San José Scale.....	25 and 26
PART 2. ORCHARD SPRAYING (Pages 27 to 50).	
Introduction .....	27 and 28
Spraying and Bees .....	28
Fire Blight Not Controlled by Spraying.....	28
Spraying for Apples .....	29 to 32
As to Spraying Pears.....	32
Spraying Peaches and Plums.....	32 and 33
How to Prepare Spraying Mixtures.....	33 to 39
Spraying Chemicals .....	39 and 40
Manufacturers and Dealers in Spray Chemicals.....	40
Spray Pumps and Appliances.....	41 and 42
Manufacturers and Dealers in Spray Pumps.....	42
Spraying Demonstrations—Proof of the Value of Spraying.....	42 to 50
Reports of Growers on Results of Spraying Demonstrations .....	44 to 49
PART 3. ORCHARD PROTECTION (Pages 51 to 58).	
Orchard Inspections .....	51 and 52
Table Showing Inspections to May, 1915.....	52 and 53
Suggestions to Purchasers of Nursery Stock.....	54 to 58
List of Larger Fruit-growers of the State.....	59 to 67

# SAN JOSÉ SCALE; ORCHARD SPRAYING AND ORCHARD PROTECTION.

By FRANKLIN SHERMAN, JR., Entomologist.

## PART I.

### THE SAN JOSÉ SCALE.

(*Aspidiotus perniciosus*, Comstock.)

Order Hemiptera.

Family Coccidae.

**Introduction.**—The San José Scale (pronounced San Ho-zay, with accent on last syllable) is widely distributed in North Carolina and does great harm to orchard trees which become infested, unless they be thoroughly and persistently treated. In order to combat it to the best advantage some knowledge of its life-history, habits, means of spread, etc., is necessary. If any one, after reading this BULLETIN and carefully examining his trees, becomes convinced that they are infested, he should cut some of the infested twigs and mail them to this office for examination.

**Appearance of the Insect.**—Trees that are badly infested with the San José Scale appear as if they had been dusted over with ashes. If the branches and twigs where the insects are numerous be scraped with a knife it will be seen that this unnatural covering is quite easily removed, coming off in little flaky patches. Examined under a hand magnifying-glass the thickly infested twigs present an appearance as shown at *b* in Figure 1. Each of the little circular gray objects is a separate scale, each covering a tiny yellow insect underneath. On thickly infested branches they often become so crowded that the scales are piled over one another so that the real bark of the tree is not visible at all. Branches and twigs which are only slightly or moderately infested will not be thus completely covered over, and the bark may be of its ordinary color and appearance except here and there along the branches where the scattering scales are found. The largest full-grown scales are about the size of an average pinhead. They can, therefore, be detected by any person who has in the beginning an intelligent idea of the insect, has sharp eyes, and looks in the right place.

Usually the farmer or fruit-grower does not know that there is any serious trouble until the trees begin to die. By that time they are covered by the scales and present the ashy appearance. Then, if the owner finds that his trouble is San José Scale, he is apt to think that it is only on those trees that present the unnatural appearance, when in reality it may already be on every tree in the orchard. Such a mistake often costs the

lives of many trees, since the owner, instead of examining closely and treating every infested tree, as he should do, simply takes out those which are already in dying condition, and then, because he sees no more of similar appearance, he imagines he has *exterminated* it, when as a matter of fact other trees moderately or slightly infested still stand in the orchard and soon begin to die, having in the meantime spread the insect into still other trees, and so on, until the whole orchard may be ruined.

Where the scales are not numerous enough to crowd one another each individual grows to somewhat larger size than when they are crowded.

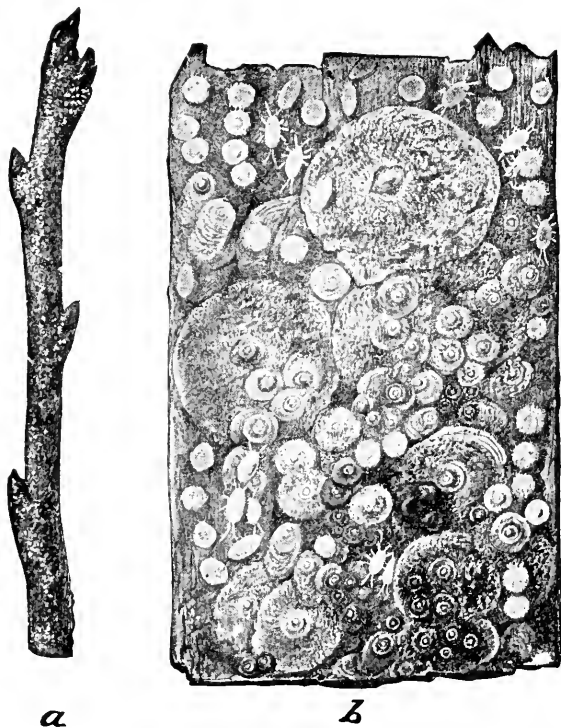


FIG. 1.—THE SAN JOSE SCALE.

*a.* Appearance of infested twig, natural size. *b.* Part of infested twig, as seen under a lens.

(After Howard and Marlett, U. S. Department of Agriculture.)

Where the scales are scattered along the branches each scale is *often* (but not always) in the center of a slightly reddened spot on the bark. If the natural color of the bark be reddish this spot will not show plainly, but if the bark be of a light green or yellow, the reddish spots are quite conspicuous. *In looking for scale on slightly infested trees it may usually be more readily found by looking for these reddish spots than by looking for the scale itself, but close watch must be kept for both scales and*



*blotches.* If such a spot be found, however, it must then be examined to see if it is caused by a true scale-insect, for there are certain unimportant diseases which may have a similar appearance. If the little gray, circular scale is found in the center of the spot, and if the scale is readily moved by scraping gently with a knife blade or with the finger nail, then you may be quite sure that it is San José Scale, and should at once send specimens to the Entomologist and get further information.

Turn one of the scales over gently with the point of a knife. If it is one of the large, full-grown scales the insect may as likely be dead as alive under it, for the scale often adheres long after the insect is dead. If the insect is alive it will be seen as a little, yellow object—slightly egg shaped, but more pointed at one end, and slightly flattened. Indeed, it has been well described as resembling a tiny bit of cheese or yellow butter. Press the body with the point of the knife or pin and it is easily crushed, yielding a tiny bit of yellowish, oily liquid. If, on the other hand, the insect is dead, the dried body will likely be found simply as a thin yellowish-brown particle under the scale.

If you simply rub the flat of a knife-blade along a thickly infested branch the insects will be crushed in such numbers that the oil from their bodies becomes quite conspicuous, though of course not enough to run down the limb.

**Where to Find it on the Tree.**—The insect feeds by inserting its tiny beak into the bark and sucking out the sap. The young insects are so very small and delicate that they cannot settle well on old tough bark, and on the other hand the very newest growth is so young that there are not likely to be many full-grown scales upon it, so that it is usually on the wood of last year and the year before that the scales are most readily found, and in examining a tree for this insect we should examine especially wood of that age. Thus in inspecting nursery stock we would look on the trunk and on the larger branches, while in orchards we look on the two-year wood near the ends of the branches. Of course it may be found also on either the newer or older wood, but it is more often found on the one- and two-year growths.

The young insects in their search for a place where they can insert their tiny, delicate beaks, often settle on the fruit. If the fruit is green, whitish or yellow in color the infestation may be quite readily detected by the reddish blotches (Fig. 2); but if the fruit be red, these will not show so plainly. Remember, however, that there may be reddish blotches or pimples on the fruits which are not caused by the San José Scale, and you should examine them closely to make sure. On apple fruits the scales are apt to be especially abundant at the blossom end.

The insects also show a decided tendency to settle close by, or under the buds, and at the rings which mark the end of a year's growth. In inspecting trees special attention should be given to these portions.

**Male and Female Scales Are Different.**—In Figure 1, note in the enlarged picture that in the extreme lower right-hand corner there is a scale which is oblong in shape rather than rounded. Two other similar scales are seen near the left border of the figure, about an inch from the top. These are *male* scales, and may be at once distinguished from the female scales, which are nearly circular. The very large circular scales are of the full-grown female insects, and these, at largest, are about the size of a pinhead, so you can see by comparison that the partly grown scales are quite small. Females are usually much more abundant than the males.

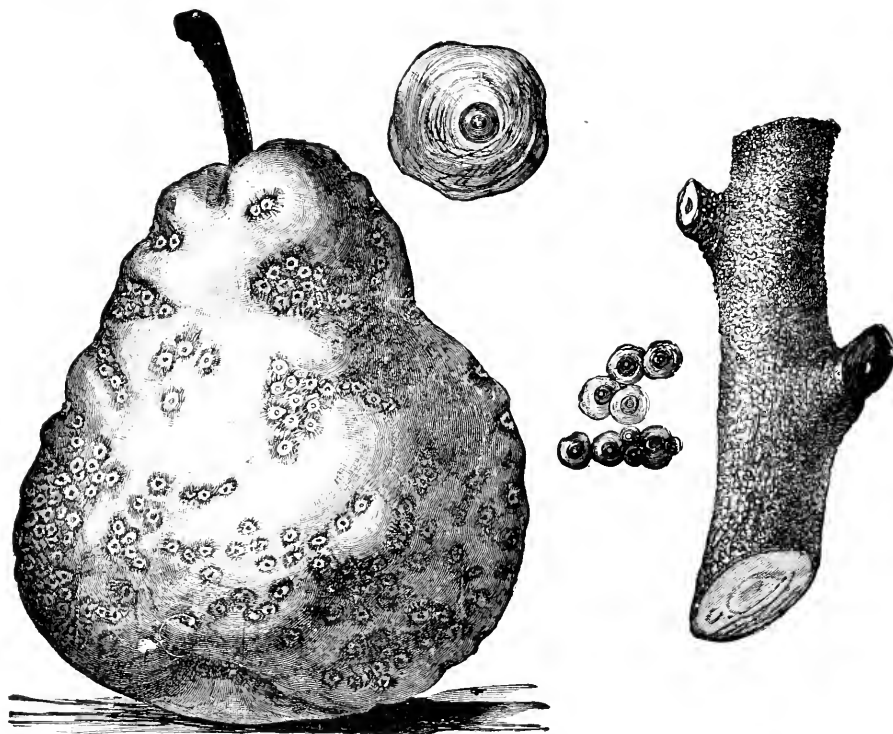


FIG. 2.—THE SAN JOSE SCALE.

Infested twig to right; immature scales in center; full-grown female scale above; infested pear fruit to left, showing reddish blotches.

**Young Insects and Young Scales.**—Now look at Figure 1 again. On the right-hand border, about an inch from the top, notice an insect which has legs. This is a young scale insect which has a few hours liberty after birth before it begins to feed. At this stage it can crawl about. Several are to be seen in the figure, especially near the top. These young insects when in this active crawling stage are so extremely small as to be barely visible with the unaided eye, and are yellow in color. After the young

insect has crawled about for an hour or so it becomes hungry and inserts its slender, delicate beak into the tender bark and begins to suck the sap. Then the scale begins to form over its body. At first it is of the same oblong shape as the body of the young insect, and whitish, as shown in the center of the figure, at the top. Then the scale becomes more rounded, and as it grows it becomes darker, until it is dark gray or almost black. Once the scale begins to form over the body the insect remains attached to the bark at that spot.

**The Full-grown Insects.**—The full-grown female insects always remain under their circular scales and there give birth to their *living young*, for this species does not lay eggs as is the case with most insects. The males, on the other hand, finally develop into tiny two-winged fly-like insects, but in consequence of their sex they cannot play much part in spreading the insect, as young can only be born where females are present, and these as we have stated remain attached to the twigs.

**The Life-history of the Insect.**—Many points in the life-history have already been mentioned. The females begin to give birth to living young in the spring. In this the San José Scale is an exception to the rule among insects, which in most cases lay eggs. At Raleigh, breeding begins from March to May, depending on season. After crawling for a short time the young insects insert their beaks and begin to feed. Then the skin is shed and the scale begins to form over the body and the insect is thus confined at that spot. When the skin is shed, the legs, eyes and antennæ (feelers) are shed off with it, and thereafter the female insect is always eyeless, legless and wingless; simply has the organs for taking and digesting food and for reproduction. It takes the females from thirty to forty days to reach maturity and the males not quite so long. The male develops finally into a tiny, yellowish, two-winged flying insect. Strange to say, the mature male insect has no mouth for taking food, the position of that organ being occupied by an *extra* pair of eyes. This renders it more proficient in finding mates and thus aids in the multiplication of the species. In this State there are probably from five to eight generations in a season, and the number of progeny of a single fertile female, in the course of a season, if there were no fatalities, would by actual calculation number among the *billions*. Remembering that many of the insects are destroyed by enemies as described later, we can still see that it is no wonder that a tree that becomes infested while young is almost sure to die unless thoroughly and persistently treated. The most active period of increase is during August and September. Enlarged illustrations of the different stages of the San José Scale are shown in Fig. 3, which appeared in a Bulletin of the U. S. Dept. Agr. just before this BULLETIN goes to the press.\*

\*Farmers' Bulletin 650, "The San José Scale and Its Control," by A. L. Quaintance.

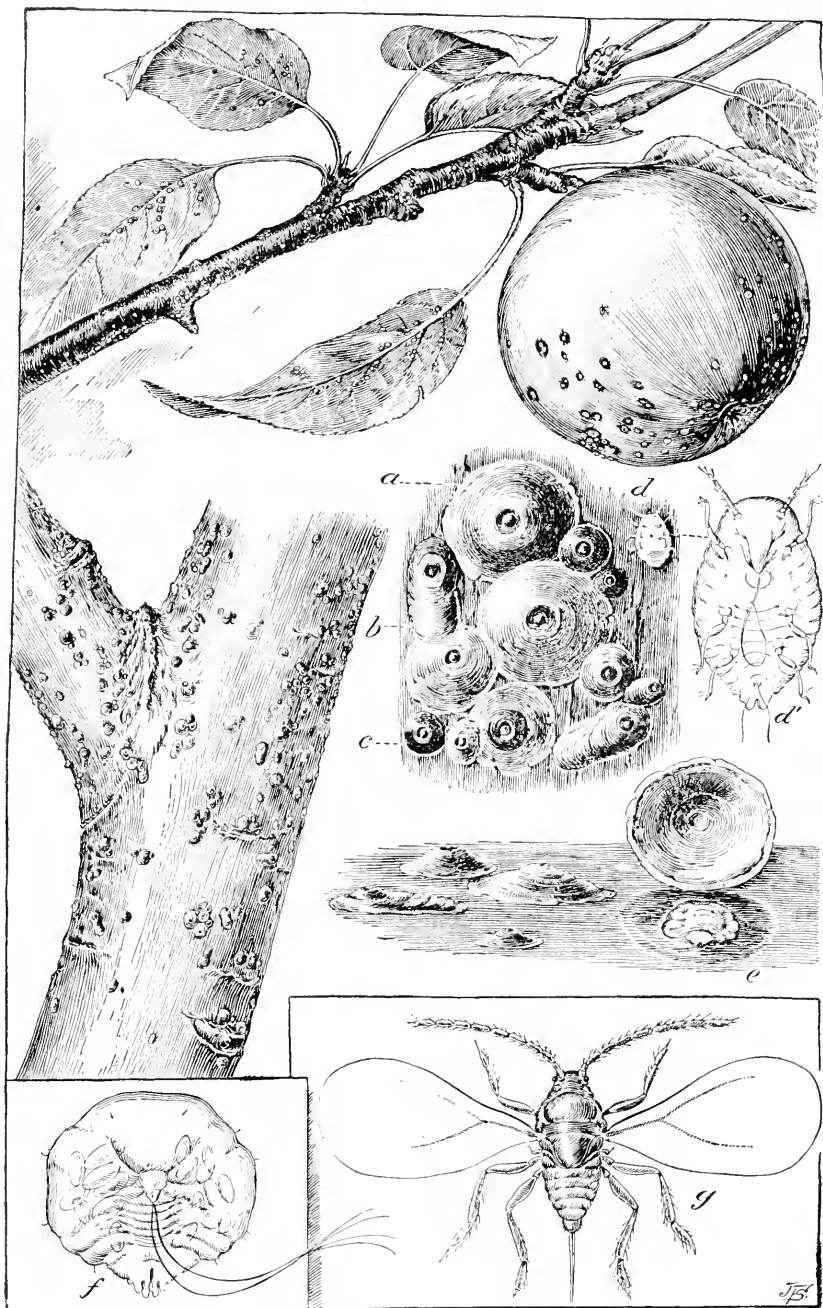


FIG. 3.—The San José Scale: *a*, adult female scale; *b*, male scale; *c*, young scale, partly grown; *d*, young insect just born; *d'*, same, much enlarged; *e*, scale removed, showing body of female beneath; *f*, body of female insect, more enlarged; *g*, adult winged male of San José Scale.

The twig with fruit is shown natural size; section of branch at left nearly twice natural size; other figures all very much enlarged.

(After Quaintance, Bur. Ent., U. S. Dept. Agr.)

**Hibernation.**—When really cold winter weather comes on the insects cease to breed. During the winter the adult insects nearly all die, so that it is mostly the partly grown insects that pass the winter. However, in warm winters we have known the insects to breed even in midwinter on warm days in the warmer sections of the State.

**How Does the Scale Spread?**—We have seen that the insect can only crawl about for a few hours after birth, and that therefore it could only spread very slowly, and only during the breeding season, if it were entirely dependent upon its own powers. As a matter of fact, however, there are various outside agencies which aid them in spreading into new trees, new orchards and new localities. Chief among these outside agencies are: (1) Wind, (2) Birds, (3) Insects, (4) Commerce in nursery stock. These, with its own limited natural powers, constitute its principal methods of spread. We will consider each of these separately, considering first its natural powers.

*Natural Spread.*—If one of the young insects should start out as soon as born and run as rapidly as it could until it became necessary for it to settle down and begin to feed, it could only travel a short distance, perhaps one or two rods. It is evident, therefore, that the vast majority of the young insects settle on the same tree on which they are born. If the trees are so set and pruned that the branches of separate trees do not interlock, it will be almost impossible for the young insects to get from one tree to another of their own accord, and this is an important point, for the spread of the scale in thickly set orchards may be very materially lessened by keeping the branches so pruned that they shall not reach from one tree to another. But in spite of this the insects will usually spread to the other trees more or less rapidly by other means.

*Spread by Wind.*—Notice that we have said that the young insects are very, very small; therefore, if a wind blows through the orchard during the breeding season (from April to December) the young crawling insects are liable to be blown about from place to place like particles of dust. Indeed, in almost every case where a large orchard becomes infested it is to be noted that it spreads most rapidly in the direction of the prevailing winds. Of course it is mere chance whether the young insects which are thus blown from one tree will find lodgment on another, and these winds no doubt leave many thousands to die on the ground. But it is perfectly evident that many are spread from tree to tree by this means.

*Spread by Birds.*—If a bird alights in a scale-infested tree at any time during the breeding season some of the young insects may crawl upon its feet or feathers and be carried off into other trees, there to crawl off again. There can be no doubt that they are often established on new trees in this way. We have frequently found in our inspections that the portion of a tree close around an old bird's nest may be thickly infested, while other parts may be slightly infested or almost entirely free from the insect. In towns and villages we have found similar evidence, the

lower branches, next to the street or walk, being most frequently infested, thus indicating that the English Sparrow plays an important part in its spread in such places.

*Spread by Insects.*—Insects play a part in the spread of this pest similar to that of the birds. Especially during the blossoming season, many insects are busy going from tree to tree and are thus liable to spread the young scale insects.

*Spread by Commerce in Nursery Stock.*—All the means thus far considered contribute to the spread of the San José Scale to a limited extent—not more than a few miles at most. But by the shipment of infested trees from place to place the scale may be spread over great distances. If a nursery in California or Oregon were infested and trees were ordered by a grower in North Carolina the trees would be dug and shipped, with scales attached, and the infestation would begin where the trees were planted.

We have stated that the insects have a tendency to settle near the buds. Now if a nurseryman desires to propagate a variety, it is done by cutting the buds and placing them in a young tree. If the tree from which the buds are taken be infested with scale, the nurseryman is likely to introduce the insect into his nursery, and then send it out to his customers on the trees which they purchase.

We can see, therefore, that although the San José Scale has very limited natural powers of spread, it is nevertheless able to spread with considerable rapidity, aided, as it is, both by accidental causes and by the hand of man.

**What Kind of Plants May be Infested?**—The San José Scale is not capable of living and thriving on all kinds of plants, and it is extremely important that the grower should know which ones are most liable to attack. It is primarily a pest of *orchard trees* and it is an exception, rather than the rule, to find it on any other. Of the orchard fruits, peaches, plums, apples, pears, and cherries seem to be worst attacked and die most readily in the order named. Certain varieties, especially of pears, seem to show considerable resistance, the Kieffer, Leconte, and Garber seeming to be less attacked than others, though by no means exempt. Sour cherries are also resistant.

Currants, Gooseberries, Roses, Grapes, Osage-orange, Thornapple, and Japan Walnut are all quite subject to the San José Scale, though not so readily attacked as the orchard fruits. Then there comes a long list of other plants upon which it is of accidental or rare occurrence, such as Persimmon, Walnut, Poplar, Chestnut, Sumac, Catalpa, Willow, Linden, Ash, Dogwood, Elm, Maple, Strawberry, Raspberry, Milkweed, Spruce, Cedar and even Crabgrass. But it must be remembered that its occurrence on the last is unusual and as a rule they are not attacked, even though they stand close to orchard trees that are badly infested.

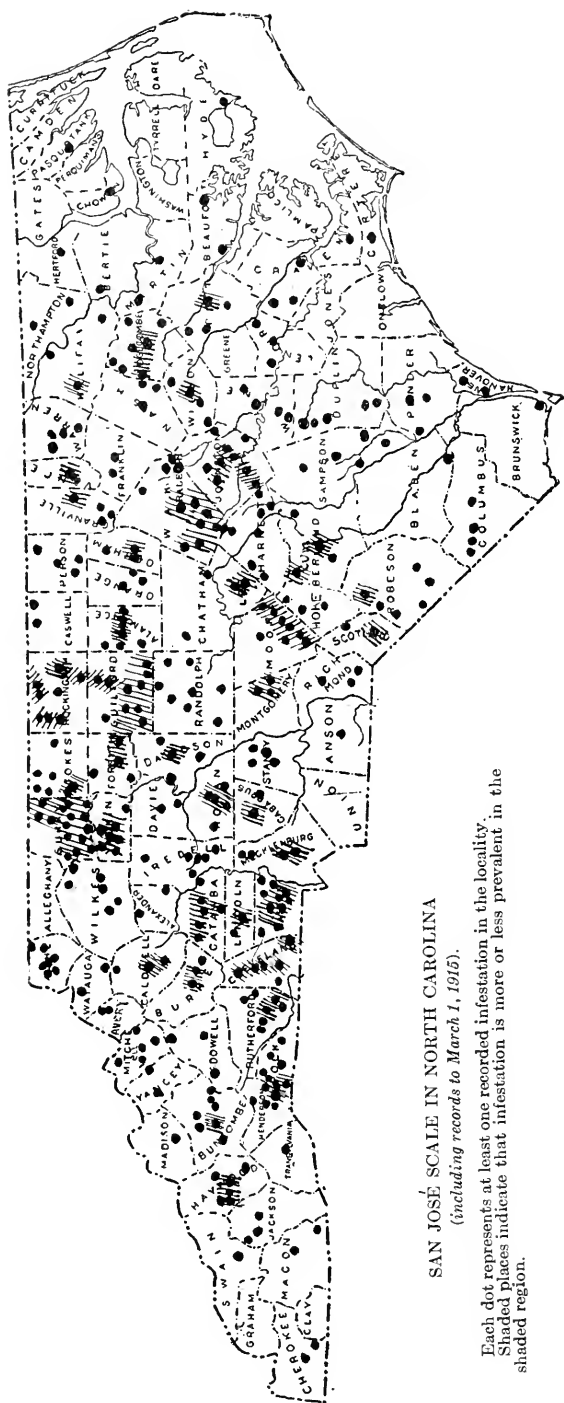
Forest and shade trees are not commonly infested with the San José Scale, and are not appreciable factors in harboring or spreading infec-

tion. Growers sometimes make serious and ridiculous mistakes on this point and give up hope because they imagine that the "scale is in the woods," or they try to destroy the forests which they suspect, or spend hours in a fruitless search for it on the forest or shade trees, and then, when they find a scale (which is some other species in nine cases out of ten) they think that they have surely found it.

Let us repeat, then, with greater emphasis, that: *the San José Scale is primarily a pest of orchard fruit trees; it may also occur, but less frequently, on rose, grape, currant, gooseberry, mockorange, and Japan walnut, but forest trees are not appreciable factors in harboring or spreading it.*

**How Long Before it Kills the Tree?**—The answer to this question will depend upon the kind of tree and the age at which it first becomes infested. Let us consider a few examples: 1. If the tree becomes infested as soon as budded, peach and plum are likely to die in from one to two years; apple, pear, and cherry in from two to four years. 2. If they become infested when five years of age, peach and plum will usually die in three or four years, pear in four or five years, and cherry and apple in four to six years, or perhaps not at all. 3. If they become infested at the age of eight years or over, our observation has been that apples are not likely to be killed outright, though peaches, plums, and pears may be. Of course, an infested tree should be regularly and thoroughly treated whether it is going to be killed or not, for otherwise it becomes a center from which the scale may spread to other trees or orchards. Furthermore, though a tree may be too hardy to be killed outright, yet the younger branches where the fruit should be borne may be injured to such an extent that the tree cannot mature a crop.

**The San Jose Scale in North Carolina.**—A study of the map in Figure 4 shows that this pest is widespread in this State. An examination of our data on March 1, 1915, shows that we have office records of its occurrence in eighty-five counties (out of the one hundred counties of the State), these records representing 512 localities (counting each post-office and each different rural route as a locality), and they embrace 1,176 different orchards, farms, or premises. New records are added almost every week, often several in one day. In April, 1912 (three years ago), our records included less than 900 premises. It is perfectly evident that there must be many hundreds, and even thousands, of orchards, town lots, etc., upon which this scale is present, but of which we have no record. It is positively known to occur at sea level in Brunswick County in the extreme southeastern part of the State, and on the high mountain ranges (over 4,000 feet) of Watauga County in the northwestern part of the State, and it is destructive in both places. As these points represent the two extremes of altitude and temperature to be found in our State, it is plainly seen that there is no section of North Carolina where it will not thrive. It is also known in the eastern counties of New Hanover, Pender, Carteret, Hyde, and Pasquotank, and in the western counties of Chero-



SAN JOSÉ SCALE IN NORTH CAROLINA  
(including records to March 1, 1915).

Each dot represents at least one recorded infestation in the locality.  
Shaded places indicate that infestation is more or less prevalent in the shaded region.



kee, Swain, Haywood, Madison, Mitchell, Avery, Watauga, and Ashe, all of which border on Tennessee. It is recorded in eleven counties on the Virginia line, and in fourteen on the South Carolina line. And it is already recorded in practically every county throughout all the central part of the State.

This office has inspected 933 orchards throughout the State, and the records show that of all these a fraction over 64 per cent were found to have San José Scale. In 23 counties we have inspected enough to feel sure of their general condition, and in these 23 counties a fraction over 63 per cent were found to have San José Scale. See table on pages 52 and 53 of this BULLETIN for more complete data on our orchard inspection work.

It is true that we have comparatively few records of San José Scale from the extreme eastern and northeastern counties, and this is probably because very little fruit is grown there, so that its presence is not noticed. Also it is a fact that in the mountain counties a smaller proportion of the orchards are infested than in the central part of the State, and this is probably because the individual orchards are more isolated from one another by intervening mountains, hills, and forests, so the pest cannot spread so readily. It is probably true, also, that the scale does not increase as rapidly in the cooler climate of the mountains as it does in the warmer central region of the State. But our inspections in many sections have shown that where many young orchards are being planted the San José Scale is nearly always present in greater or less abundance. We have every reason to believe that a competent inspector could find it in any county of the State in a few days of careful work.

We will not say that *every community* in the State has San José Scale, though that may be true. We find it so abundant in so many places that one familiar with the facts is apt to think that it is "everywhere." Yet this office has examined many individual orchards without finding it. But the point we wish to emphasize is that there is no part of the State which is *immune* from it, and it is no doubt present in hundreds of localities and on hundreds—yes, thousands—of premises of which we have no record as yet. There are many localities (especially towns and villages) where it may be found in practically every home orchard or garden in which there are fruit trees.

And yet—knowing the remedies for it as we now do—there is less need than ever for discouragement, and no need whatever for people to become nervous or panic-stricken over the situation—for all over the State there are hundreds of persons who are keeping the scale under good practical control, the orchard industry was never in better condition, and those growers who give their orchards up-to-date attention have long ceased to regard the San José Scale with any special alarm. The real element of danger is not in finding it in your orchard, but it is in believing that it isn't in your orchard when it is, and in having it thus do damage while you are ignorant of the cause. We have found many cases where fine young orchards have been practically ruined when the owner did not

know the trouble; whereas, if he had known that he had scale he would have gone ahead with the proper treatments and saved his trees. Furthermore, in our inspections we are every year showing the San José Scale to the growers in their own orchards, and teaching them how to save the trees if they are really anxious to do so.

**Natural Enemies of the San Jose Scale.**—The orchardist is not entirely alone in his efforts to hold the San José Scale in check. There are a number of natural enemies which do more or less good in limiting the numbers of the pests. Every rainstorm during the summer doubtless washes off and drowns countless thousands of the young. There are at least two species of native Lady Beetles which commonly prey upon the

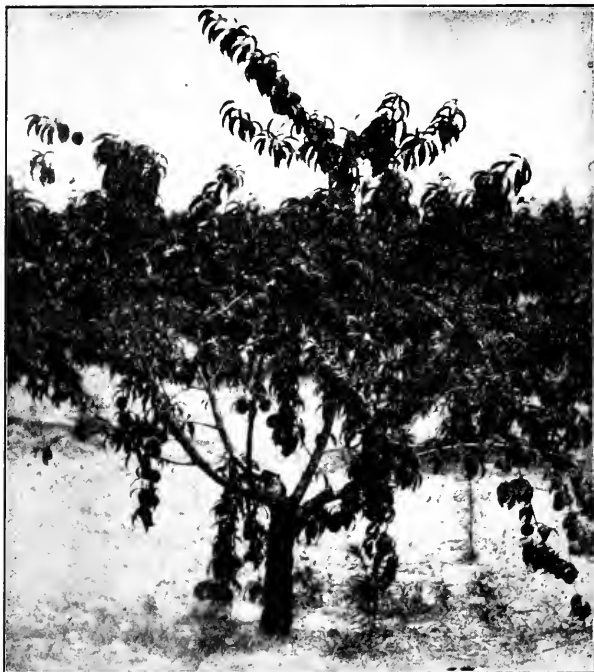


FIG. 5.—Sixth successive crop of peaches in a scale-infested orchard, showing that fruit-growing may be profitably carried on in spite of the San José Scale. (Photo by Sherman.)

scale. One of these is the Twice-stabbed Lady Beetle, about one-eighth of an inch long, black, and with a red spot on each wing cover, the spots resembling tiny drops of blood, thus giving rise to its name. The other is called the Pitiful Lady Beetle, though we know not why, unless it be on account of its small size and its jet-black color; it is not as large as a pinhead.

There are also a number of species of very small four-winged parasitic flies, which attack the San José Scale. In a recent bulletin\* Prof. A. L.

\*Farmers' Bulletin 650, U. S. Dept. Agr., p. 13.

Quaintance lists 18 species of these which have been bred from the San José Scale. He states, however, that even at the highest rate of parasitism ever yet recorded "the control of the scale by these agencies cannot be depended upon."

In Florida a fungous disease has been found to prey upon the scale to a considerable extent, but attempts to introduce this into other sections have not met with much success.

Some years ago the United States Department of Agriculture at Washington introduced from China a species of Lady Beetle closely related to our "Twice-stabbed" species, and indeed one cannot easily tell one from the other. This also feeds upon the San José Scale, but thus far has not shown itself capable of holding it in practical control. We must still rely upon the spray pump if we wish to keep this pest in subjection.

**History. Where Did it Come From?**—There has been much discussion in reports and bulletins as to the probable original home of the San José Scale. From present evidence, however, it seems certain that it originated in northern China, and that from there it was introduced into California about 1870. The insect remained unknown to science, however, until 1880, when it was first described. At that time it was destructive in orchards in the Santa Clara valley near the city of San José (pronounced San Ho-zay), in California, and it is from that city that it has received its name.

The insect was not discovered in the eastern United States until August, 1893. At that time it was found in Charlottesville, Va. It was soon found that the infested trees were purchased from nurseries which had been introducing stock from California. Then fruit-growers and entomologists began to inspect orchards especially for this pest, and in 1897, five years after its discovery in Virginia, it was known to exist in twenty States east of the Mississippi River.

It seems likely that it obtained a foothold in North Carolina about as soon as in Virginia, beginning at Southern Pines. Certain it is that it has been known in that vicinity since about 1897, and was probably there several years before it was recognized. At the present time it is widely disseminated in the State and no one can safely assume that his locality is free from it. And this same condition is true in all the other States in this section of the country.

**Name of the Insect.**—It is worth while here to designate the proper pronunciation of the name of this pest. The name San José is of Spanish origin. The "San" is pronounced just as it is spelled. In the word "José" the "J" has the sound of "H," the "s" the sound of "z," and the "é" the sound of "ay." The proper way to pronounce the name of the insect is therefore as if it were spelled "San Ho-zay," with the accent on the last syllable.

## REMEDIES FOR THE SAN JOSÉ SCALE.

One thorough spraying (or washing) each year with proper remedies will keep the San José Scale in good control. This is amply proven by the experience of hundreds of our fruit-growers and farmers every year.

It is best to give the treatment in late winter, before the buds have opened (February or early March), but any time after the leaves are shed in fall and before the buds open in spring will do. Spraying with a regular spray pump is by far the best method. For this treatment the great majority of growers depend on one of the two following:

*Lime-sulphur Wash* (either commercial or home-made), page 19.

*Soluble Oil* (of which there are several brands), page 20.

Other remedies which are used to some extent are: Whale-oil soap, kerosene emulsion, and laundry soap dissolved in water. Each of these is discussed briefly in the following pages—but we must emphasize that the great majority depend either on the lime-sulphur or the soluble oils. As between these two, each has its advantages, and among people who have had ample experience with both, some prefer one and some prefer the other, with the majority favoring the lime-sulphur. The chief points at issue are these: The lime-sulphur has the advantage of being more effective against the fungous diseases, and of whitening the bark so that it is more easy to detect (and correct) any places which have not been thoroughly treated, and its use at the recommended strengths is without danger to the trees; but it has the disadvantage of being more corrosive in its action on the spraying machinery, somewhat more disagreeable to handle, and is less able to penetrate into very small cracks and crevices than the oil sprays. The oil sprays have the advantage of being less corrosive to the spraying machinery, are easier to handle, and are more penetrating into crevices of bark or on fuzzy growth like some young apple twigs; but they have the disadvantage of being less effective against the fungous diseases, they do not make it so easy to detect places which have been missed in spraying, and their use sometimes results in injury to the trees.

We have tried to be accurate and impartial in this statement of the case between the lime-sulphur and the oil sprays. In our own work we depend primarily upon the lime-sulphur; but if we had old, rough-barked apple trees upon which we did not secure satisfactory results from the lime-sulphur, we should not hesitate to use the oils so as to get the benefit of their greater penetration and “spreading” powers; but in all ordinary cases, or whenever the scale was once brought under control, we should, from all present evidence, depend on the lime-sulphur for the regular yearly winter spraying of the orchard.

## LIME-SULPHUR WASH.\*

In using this material we have the choice between buying the ingredients and making it up ourselves, or of buying the ready-made solutions which are prepared for use merely by mixing with cold water. The lime-sulphur preparations are also very effective in checking fungous diseases on trees, and they form a coating on the bark which serves as a partial protection during part of the growing season.

## READY-MADE LIME-SULPHUR.

(Or "Commercial" Lime-sulphur.)

The commercial lime-sulphur washes can be bought ready-made from the manufacturers or from agents and dealers in some of our larger towns. Most of them are of about the same strength, and can be reduced to proper strength for spraying merely by adding water.

For winter use against San José Scale, use one gallon of commercial lime-sulphur to eight or ten gallons of water. There is no need to have the water even warm—cold water is all right. When reduced to the strength recommended for scale, the ready-made wash, as we apply it to the trees, costs about two to six cents per gallon, depending upon the quantity of the material purchased. It has the advantage of requiring no special preparation, there is no sediment or particles in it to clog the spray pump, and it is therefore more quickly and easily used. For these reasons many prefer to use it rather than to make the home-made wash.

Some firms which manufacture ready-made lime-sulphur washes are:  
Thomsen Chemical Company, Baltimore, Md.

Vreeland Chemical Company, 26 Dey St., Hudson Terminal Bldg., New York, N. Y.

James A. Blanchard Company, New York, N. Y.

Niagara Sprayer Company, Middleport, N. Y.

Grasselli Chemical Company, Cleveland, Ohio.

Bowker Insecticide Company, 43 Chatham St., Boston, Mass.

Persons desiring to use the ready-made lime-sulphur should correspond with these firms as to prices, exact quantity of water to use, etc. A number of firms in this State sell this material at retail.

## HOME-MADE LIME-SULPHUR WASH.

Many growers prefer to make their own lime-sulphur wash; therefore, we give the formula and directions for it:

Stone lime (unslaked) -----	15 pounds
Sulphur (flowers) -----	15 pounds
Water (to make) -----	50 gallons

\*In this BULLETIN we do not give directions for preparing the "Home-made Concentrated Lime-sulphur." Growers who are interested in this may apply for Farmers' Bult. 650, U. S. Dept. Agr., Washington, D. C. (and refer to page 16).

Heat from 4 to 6 gallons of water to boiling over fire in large iron or brass kettle. Mix the sulphur with enough hot water to make a thin paste, and pour it into the kettle with the hot water. Now add the lime, part at a time, and as it slakes dash in a little cold water as needed, to keep it from boiling over or to keep it from becoming dry. Keep the fire going and stir the mixture frequently. As the slaking ceases, keep it boiling from the fire for half an hour longer, then dilute with water (cold is all right) to make 50 gallons; strain through a fine wire screen or cloth to remove all sediment, and spray.

This wash, which contains 15 pounds sulphur to the barrel, *is only for use in winter when the trees are dormant*. It is an excellent remedy for San José Scale, but all treatments with it should be finished before the buds open in spring. The later the treatment is made the better, just so the buds are not open. Made according to the above directions, this wash, as we apply it to the trees, costs about  $1\frac{1}{2}$  to 3 cents per gallon, depending upon the quantities of the ingredients purchased. It has the advantage of being cheaper than the ready-made. It also makes a whiter coating on the twigs, so that missed portions can be more readily noticed (and corrected), and for these reasons many prefer it, though it requires the trouble of boiling, straining, etc., which in the minds of many offsets the cheaper cost.

#### SOLUBLE OILS.

The soluble oils share popularity with the lime-sulphur preparations as remedies for the San José Scale. They are so prepared that they mix readily with either hot or cold water, and are therefore very convenient to use. They will penetrate into cracks and crevices even better than the lime-sulphur mixtures, and they corrode and rust the spray pumps less, but they do not have so good an effect in checking fungous diseases.

The soluble oils are usually used in winter for San José Scale at the rate of one gallon to ten gallons of water.

The two firms which do most trade in this State in the soluble oil preparation are:

B. G. Pratt Company, 50 Church St., New York City, who make a material called "Sealecide."

Thomsen Chemical Company, Baltimore, Md. "Orchard Brand Soluble Oil."

If interested, correspond direct with them as to all details.

#### OTHER REMEDIES.

The other remedies referred to can be discussed briefly:

**Whale Oil Soap.**—The brand that is almost wholly depended upon is Good's Caustic Potash Whale Oil Soap, No. 3, made and sold by James Good, 939 N. Front St., Philadelphia, Pa. If interested, correspond direct in regard to prices, method of using, etc.

**Kerosene Emulsion.**—This was the standard remedy in the eastern States before the lime-sulphur wash came into use, and is still used for many other insects. Its disadvantage is that it is quite troublesome to prepare, and if at all carelessly used is liable to injure the trees. For use in winter on peach and plum, we advise that it be used not stronger than 15 per cent oil. For use in winter on apple and pear, it may be used as strong as 25 per cent. Full directions for preparing this wash are given on pages 37 and 38.

**Laundry Soap and Water.**—In a limited way we have used ordinary laundry soap as a remedy for San José Scale. The soap which we used was "Octagon." We used it at the rate of one pound of soap to one gallon of water, as follows: The soap was shaved into thin slices and put in the proper amount of water and placed over fire. When boiling-hot, stir thoroughly to dissolve the soap. Add enough water to make up for evaporation. It is then ready to apply. The extreme simplicity of this remedy makes it an easy one for persons in cities or towns with only a very few trees in the backyard or garden. But this remedy should only be applied in winter, for at that strength it would almost certainly hurt leaves or fruit.

#### WHEN TO GIVE THE TREATMENT.

**Winter Treatment Best.**—As already stated, the best *one* time to spray for San José Scale is late winter (February or early March), before the buds have opened. The later in the winter the better, just so the treatment is completed before the buds open.

**Summer Spraying for Scale.**—Sometimes we discover the San José Scale on our trees in spring or summer, when the strong winter applications cannot be safely made. In this case trees that are only moderately infested will usually live safely until the proper time for treating them in winter. But trees which are badly infested, already weakened or partly dead, may need some immediate treatment. In such cases one *may* use the regular winter applications, taking care to apply them only on the larger branches, trunks, etc., and not permit it to touch leaves or fruit. But we consider that for such summer treatment it is best to use the self-boiled lime-sulphur wash, which is discussed later in this BULLETIN (p. 36). This wash, which is safe as a summer treatment even on leaves and fruit, is fairly effective against the scale, so that one (or at most two) summer treatments with it will carry the worst trees over until the regular spraying is given.\*

**Fall Spraying for Scale.**—Although the weight of opinion is in favor of late winter as the *one* best time to spray for scale, yet a few people prefer fall spraying, and some even spray both in fall and late winter, though we do not think this is necessary as a regular practice. Fall spraying is done after all fruit has been gathered, when the leaves have

\*As the *proof* of this BULLETIN is being read, we come into possession of evidences of at least two cases—this year for the first time—of noticeable "spray injury" from use of the self-boiled lime-sulphur. We regard this as exceptional and not to be taken seriously, or as a permanent drawback to the use of this wash.

begun to drop, or soon after they have dropped. For fall spraying we believe there are special advantages in using the soluble oils, as they will penetrate more of the small crevices and reach a larger percentage of the small young scales which pass the winter. On the other hand, the lime-sulphur solutions leave a coating on the branches so that when they are applied in late winter this coating acts as a considerable protection to the trees during spring and early summer. So, if one wants to come as near as possible to exterminating the scale, we believe that the best plan would be to use soluble oil in fall and lime-sulphur in late winter. But we want to emphasize the fact that the insects are so small that absolute extermination is impracticable (if not absolutely impossible), and even at the best we must expect, and plan, to treat infested trees once each year.

**Can We Occasionally Omit Winter Spraying?**—As a general rule, we should say that when once the San José Scale is found in an orchard, it should be the plan and policy to give the orchard the winter treatment for scale every year thereafter. This is a safe rule, and any *careless* departure from it may result in trees being killed by the scale. But if the grower has become thoroughly familiar with the scale, so that he knows positively the condition of his trees, then when he finds that he has reduced the scale to very inconsiderable numbers, and if his orchard is fairly well isolated from other neglected orchards or trees around, we believe that he might then occasionally omit the scale-spraying for one winter and not seriously lose in consequence, especially if he uses some of the milder lime-sulphur solutions during the growing season. Let us not be misunderstood on this point: it would be very unwise to omit the winter scale-treatment in an infested orchard for two winters in succession, but in orchards that have been so thoroughly sprayed that the scale is almost eliminated we believe the winter scale-spray might be omitted once in a while as a matter of economy. As we write this we have in mind well-kept, vigorous young apple orchards on steep mountain land where spraying is very laborious and very expensive, where scale-spraying *has been practiced* until only the most searching inspection will reveal the presence of scale. In such orchards, where time, labor, and money cost are serious factors, we believe that a careful and observant grower might omit the winter-spray for one year and not lose by it; it might be that he could omit it regularly every third winter. But in this he must use judgment and discrimination, and must be sure of conditions before relaxing his vigilance. Apple trees can withstand attacks of the scale longer than peach trees, hence the apple-grower in the mountains can try this more safely than the peach-grower in the central or eastern parts of the State.

**Preparing the Trees for Treatment.**—If the trees are to be treated in summer, it is not necessary to give them any special preparation other than to cut out those branches that are already dead; but for winter treatment some preparation is desirable to get the best results. It may



be said, however, that some growers do fairly well by spraying thoroughly every winter, without giving the tree any previous preparation or pruning.

It is best that the regular winter pruning be given before the trees are treated for scale. Cut out all branches that are already dead or fatally injured. Shorten back the limbs so that what remains can be easily reached and thoroughly treated. For trees that are only slightly or moderately infested, this pruning need not be any more severe than is usually given. Trees that are quite thickly encrusted with scale should be cut more heavily, so as to throw more vigor in the remaining branches and to encourage new growth. When a question arises which of two limbs to cut, take out the one that is most infested with scale.



FIG. 6.—Peach trees before pruning. Note how difficult it would be to thoroughly treat all the long, slender twigs. (Photo by Sherman.)

Trees that are so badly infested that they are already dying may often be saved by cutting them back to mere stubs, treating the stubs thoroughly, and a new top may be had in the course of a few years. This is especially the case with peach trees, many of which are treated and saved in this way.

**Destruction of Infested Trees.**—We do *not* recommend that trees that are infested with San José Scale be destroyed, unless they are beyond hope of saving, or unless the owner does not intend to treat them.

But if the scale is discovered in spring or early summer, and some of the trees are so badly infested that they will surely die before winter, then either give those trees thorough summer treatment or destroy them.

Likewise, if you fail to get the orchard treated in winter as intended, and spring opens up with a lot of badly infested trees in the orchard, the very worst ones should be cut out.

It should be remembered that all through the late spring, summer and fall, even until Christmas, or perhaps later, the scale will be breeding, and every wind or passing bird may carry away the young lice and establish them on new trees. This is why the trees which are already useless should be destroyed—they cannot do good, and they do much harm by spreading the scale.



FIG. 7.—Same orchard as shown in Fig. 6, after being pruned and sprayed. Note that all branches were shortened and that the trees are in thrifty condition. (Photo by Sherman.)

Late summer and fall, say from late August to middle of November, is the season when the scale multiplies and spreads most rapidly. This makes it especially important to take out whatever trees are going to be destroyed before midsummer.

There is one case in which we would advise destruction of trees that might be saved. Suppose a man has *an orchard of young trees* and finds only a very few trees badly infested. In such a case we may hope that it has not spread far, and by promptly destroying those *few* trees—even if they could be saved—and by thoroughly treating all the trees close by, he may so check the scale as to avoid the need of fighting it on all his trees for several years. But it must be remembered that the scale will likely be more widespread than at first appears, so that close watch must be kept for it in all parts of the orchard.

But let us say again that we do not advise the destruction of trees except in extreme cases. If you are in doubt whether or not to destroy a tree, then spare the tree; BUT (and this is the important point) do not fail to treat it *thoroughly* at the first suitable opportunity.

**Cannot Exterminate Scale.**—No one need expect to “exterminate” or “get rid of” the San José Scale when it once becomes firmly established in his orchard, no matter what measures he uses. It is here to stay, and our growers need to recognize it as a permanent pest, to be fought regularly and intelligently. If this be done there is no difficulty in keeping it under good control; but the man who starts in with the idea that he can exterminate it is apt to merely deceive himself. We need to look at

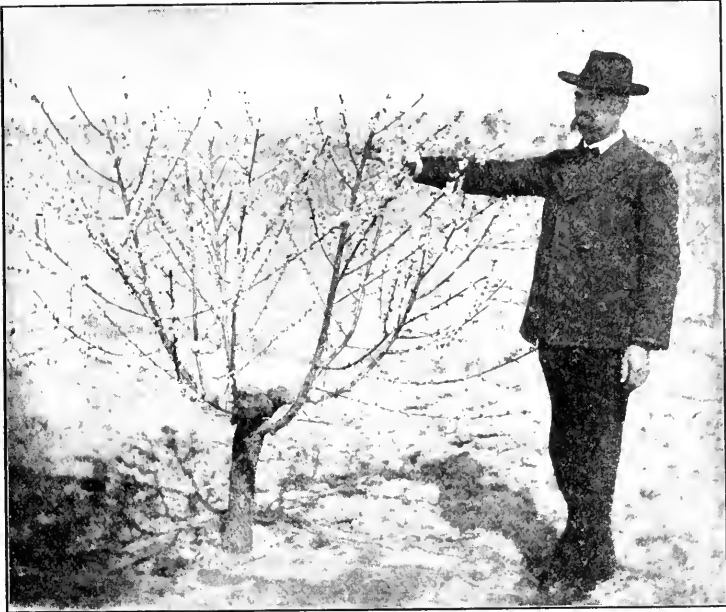


FIG. 8.—Peach tree cut back to stub two years before, now making new top and filled with bloom. (Photo by Sherman.)

this thing in the light of common-sense experience. We don't expect to “exterminate” potato beetles, but the means of control are such that no potato grower need lose a crop from them. We do not expect to “exterminate” the flies in our houses, but the means of control enable us to reduce their number and control them. No insect pest which has so many means of spread has ever been absolutely exterminated when once thoroughly established. It is a matter of *control*, not of *extermination*.

### OUR POLICY IN REGARD TO SAN JOSÉ SCALE.

Many persons think that the State Department of Agriculture makes a practice of destroying all orchards that are found to be infested with San José Scale, and for this reason some people hesitate to let us know that they suspect the scale is in the orchards, or they hesitate to give the names and addresses of their neighbors and friends whose orchards may be infested.

This idea is incorrect and harmful. We wish to give every person concerned full information about the San José Scale, and the remedies for it, and it is left largely for each man to adopt his own course in caring for his own trees. Our plan is to show the danger, and to point out the remedy, and to keep those whose trees are infested informed as to the proper means of control. But it is wholly impossible for the Department to follow up all cases and compel treatment, even if there were a desire to do so. The scale is now known to exist on the premises of nearly 1,200 persons, and in nearly all the counties of the State.

We want the *name and address* of every person whose trees are infested with San José Scale, merely in order that we may help, not to destroy. Those who have been long in touch with us understand these facts, and we hope they will help us by getting their neighbors whose trees are infested or suspected to write to us, sending sample twigs for examination. Every person who thinks his trees are infested should make sure by sending twigs with his name and address plainly written on the package, and a letter of explanation. Even two or three twigs in the envelope with the letter will often be enough. It is mainly those who do not know that their trees are infested, or who are not fully informed on the subject of controlling the scale, or who are indifferent, that are losing their trees from attacks of this pest.

It should be said that the laws of the State *do* give power to compel the treatment of trees, or to compel them to be destroyed if the owner will not treat them. But this power is seldom used, and then only in the most extreme cases where a man's neighbors complain of him continually, and where no appeal to his reason has effect. It is necessary that there should be such power, but it is equally necessary that it shall not be used hastily, or when there is no serious need for it.

## PART II.

## ORCHARD SPRAYING.

## INTRODUCTION.

In the first part of this BULLETIN we have fully discussed the San José Scale and the remedies for it. And that opens the way for a general discussion of orchard spraying for the control of many other kinds of insects and diseases which damage our trees and fruit every year. Any person who has an orchard large enough to yield *fruit to sell* should certainly know the different mixtures used in spraying, how they are prepared, when to use them, and why—for spraying means money profits to such a person, whether there is any San José Scale in his orchard or not. And the person who has San José Scale should have the same information, because when he is once prepared to spray his trees for scale, it is a simple matter to go a little further and give the other treatments for the other pests. The only persons who are really justified in not spraying are those who have only a few trees for home use and these not infested with scale.

The demand for information about the spraying of fruit trees is very active and scores of our fruit growers are taking up spraying each year who have not followed the practice before.

“Please give me full directions for spraying my orchard.” That is a common form of inquiry, and while we give much of the information needed in these pages, yet the grower must remember that there are many small details that can be mastered only by experience and observation.

Just at this time there is some uncertainty as to the relative merits of the Bordeaux Mixture and the Lime-sulphur Wash for the control of fungous diseases in the orchard; but the recommendations as given in this BULLETIN are based, not only on our own experiences and observations and the experience of growers in the State, but also on the recommendations of the officials in the United States Department of Agriculture. We feel sure, therefore, that they are as near correct as they can be made from present knowledge. In this BULLETIN we give preference to Arsenate of Lead as the poison to use in spraying fruit trees, as results from its use are much better than from Paris Green.

Insect pests and diseases of various kinds make it necessary to spray our fruit orchards. Examine our fruits in summer or fall and notice the knotty, dwarfed, wormy and specked ones, and you will be convinced. However, some of the diseases and insects which attack the *apple* are quite different from those which attack the *peach*, so that the treatment is different for these two fruits. Hence we discuss separately the spraying of the apple orchard and the spraying of the peach orchard. Pears

are subject to nearly the same troubles as apples, but do not suffer so much from them, and spraying does not generally give such good profits. Plums, on the other hand, have almost exactly the same enemies as the peach and require practically the same treatment.

**Spraying and Bees.**—Honey-bees are one of the chief agents in pollenizing our fruits, and we should use every reasonable care to do them no harm. If spraying is done at exactly the proper times there should be no trouble on this point, for no spraying is advised when the trees are in bloom. The chief difficulty lies in the fact that many growers begin the spraying for Codling Moth while the trees are in bloom in order to finish in time. This is not necessary and is harmful. If the grower will wait until all or practically all of the blossoms have fallen before using the poisoned sprays, he will have just as good results in controlling Codling Moth and Curculio, and will have better results from the pollenization. If the trees be sprayed while they are in bloom the pollen is wetted so that the pollenization is less perfect, and the petals of the blossoms themselves are in the way, so that the spray does not readily reach the blossom end.

The interests of both the fruit-grower and the bee-keeper are in perfect agreement. It is a mistake for the grower to spray when the blossoms are still on the trees. Indeed, so long as there are enough active and fragrant blossoms to attract bees in any number it is too early to spray for Codling Moth or Curculio. Wait until the blossoms *have fallen*, and then spray promptly.

**Fire Blight Not Controlled by Spraying.**—We wish to call special attention to the fact that no spraying treatment is known which will control, prevent, or cure the "Fire Blight" which is so often destructive to apple and pear. Every spring we hear complaint of this disease killing the fruiting spurs of apple, or whole limbs or whole trees of pear; and growers are often of the opinion that their spraying has been a failure, or if they have not sprayed, they think that spraying might have prevented the trouble. Not so; spraying *does not* control Fire Blight, though it is very effective against many other serious troubles.

Those who wish special information about Fire Blight, or about other *diseases* of plants, should correspond with Division of Plant Pathology, Experiment Station, West Raleigh, N. C.

The Division of Entomology of the State Department of Agriculture at Raleigh, N. C. (which is responsible for this BULLETIN) is concerned primarily in the control of *insect pests*, and the methods of spraying here described are mainly for insect control, though the mixtures are so prepared and applied at such times as to give a great deal of protection from diseases also.

## SPRAYING FOR APPLES.

To give a good all-round protection requires from three to five sprayings each season, as follows:

**1. Winter Spraying.**—*Use Commercial Lime-sulphur Wash at rate of 1 gallon to 8 or 10 gallons of water (see page 19), or, if you prefer, you may make your own Lime-sulphur Wash at strength of 15 pounds lime, 15 pounds of sulphur, to 50 gallons water (see p. 19, or pp. 33 and 34).*

This winter treatment is especially for San José Scale. If this pest is not troubling you, you need not use this treatment every year; but it has such a good general effect on the trees that it is best to use it every few years anyway—and it is important for those who have San José Scale to use it every year.

**2. Just Before Flower-buds Open.**—*Use Commercial Lime-sulphur at rate of 1½ gallons to 50 gallons water and add 3 pounds of Arsenate of Lead Paste. (See pages 33 and 34.)*

We do not regard this treatment as absolutely necessary, but it does good and will pay if one can get it done. It checks the very earliest caterpillars and diseases which attack young leaves and flowers. But if one gives the winter spraying already described and gives the treatment just after blossoms fall, it will seldom be really urgent to give this one. If you must omit any of the sprayings let it be this one, as we regard it as the least important. This is often called the "Cluster-bud Spray."

**3. Just After Blossoms Fall, Promptly.**—*Use Commercial Lime-sulphur 1½ gallons to 50 gallons water and add 3 pounds Arsenate of Lead Paste. (See pages 33 and 34.)*

This is the most important spraying of all for the fruit, and should never be neglected in bearing orchards. Its special object is to kill the Codling Moth which makes the "wormy apple," and as the worm usually enters at the blossom end we must spray promptly after the blossoms fall, as the blossom end is then open and will receive the poison. All the trees will not shed the blossoms at the same time, so we must strike at the best time for the average, or for the ones we prize most, and every effort must be made to lodge some of the spray in the open blossom end of each young apple.

**4. Three to Four Weeks Later.**—*Use the Bordeaux Mixture at rate of 4 pounds Lime, 3 pounds Bluestone, 50 gallons water, and add 3 pounds of Arsenate of Lead Paste. (See pages 34 and 35.)*

This treatment, coming three or four weeks after the blossoms have fallen, will be when the apples are about an inch in diameter, more or less. It will reach some Codling Moth which escaped the third treatment and will catch caterpillars which may have started since. As the leaves will be nearly grown, this treatment will usually benefit them for the rest of the season. It also protects the fruit considerably from rots which attack it later in the season.

NOTE.—Right here a word of caution is needed. Some want to use the weakened Lime-sulphur (as in the third spraying) instead of the Bordeaux. All right for those who prefer—it will do very well; but the evidence is that the burning effect of Bordeaux Mixture which has been quite conspicuous in recent years comes from the application just after the blossoms fall, and that the Bordeaux can be used for this fourth (and any later) treatment without the burning. Furthermore, the Bordeaux is a better preventive against Bitter Rot and other midsummer diseases than the weakened Lime-sulphur. Hence we would prefer to use it, if we can avoid the burning effect.

The United States Department of Agriculture tests show good results when using 4 pounds Bluestone and 4 pounds of Fresh Stone Lime to 50 gallons in making Bordeaux for this treatment. But in consideration of some damage in this State, we venture to recommend only 3 pounds of Bluestone and 4 pounds of Fresh Stone Lime to 50 gallons of water. Some of our growers use only 2 pounds Bluestone and some do not use Bordeaux at all, but depend entirely on the Lime-sulphur. In tests made by this office at Greensboro, N. C., in 1910, leaf spot was a little worse on trees sprayed with Lime-sulphur than on those sprayed with Bordeaux, and the rotting of fruit on the trees began on those sprayed with Lime-sulphur earlier than on those sprayed with Bordeaux. Therefore, we prefer the Bordeaux, but take all possible caution to avoid the burning.

**5. Summer Spraying.**—*Ten Weeks Later. Use the same as in the previous treatment.*

This treatment should come about middle of July, and will help to prevent the diseases that attack the leaves and fruit late in the season, such as Apple Blotch and Bitter Rot, and the rotting of the fruit on the trees in the warm days of early fall. This midsummer spraying is more important here than in the cooler sections of the United States, and it is more needed in the warmer sections of the State than in our higher and cooler mountain sections. It might be that the rot diseases would be so destructive as to make other summer sprayings desirable; but as this BULLETIN is being written primarily with reference to control of the insect pests, we will not go further into detail on this point.

#### WHICH TREATMENTS ARE MOST IMPORTANT?

The foregoing outline of five sprayings is for the man who wants the best of results, and is willing to do the work to get the best returns. But many will want to know which treatments they may leave out. Let us see: The spraying just as the buds open (No. 2) reaches the least number of important pests, and so may, perhaps, be omitted more safely than any other. If you have no San José Scale, then the winter treatment (No. 1) *can* be omitted, although it is better to give it anyway (at least every two or three years), even if there is no scale. If you are not troubled with Bitter Rot and the apples rotting on the trees, then you



can omit the midsummer spraying (No. 5). The treatment that comes three or four weeks after the blossoms fall (No. 4) *can* be omitted if necessary. This leaves only one more, namely, the one just after the blossoms fall (No. 3), and this is *the one most important* treatment for every bearing apple orchard, for every such orchard is infested with Codling Moth, Curculio, and leaf-eating insects, and we simply *must* give this treatment after the blossoms fall, if we are to have a full crop of perfect fruit. Here is a statement of what we consider the relative importance of the five treatments:

First in importance—No. 1. Winter treatment, if there is scale.

Second in importance—No. 3. Just after blossoms fall.

Third in importance—No. 5. Summer spraying, if fruit rots on tree.

Fourth in importance—No. 4. Three to four weeks after blossoms fall.

Fifth in importance—No. 2. Just before flower-buds open.

So it depends upon what your troubles are as to which of the treatments you can afford to miss. If you have no scale, but have trouble with fruit rotting on the trees, then you must give the summer treatment, while you may leave out the winter one. But if you have scale and do not have trouble with the rots, then you must give the winter treatment and may omit the summer one. If you have both scale and rot, then you must give both the winter treatment and the summer treatment. But every bearing orchard has Codling Moth, Curculio, and leaf-eating insects which are reached by the treatment just after the blossoms fall (No. 3), so that stands out preëminent as the one treatment that every bearing orchard should receive.

Experience is the only teacher that can show to each and every grower just what precise treatments he should use. One man will adopt a regular system of three treatments, another two, another four, and another five. But it is only the grower who studies for himself, and who knows just what the most important enemies in his own orchard are, who can hope to get the best results.

#### SPRAYING OF APPLES REDUCED TO SIMPLEST TERMS.

There are a good many growers who would like to get good fruit and would be willing to go to some expense to get it, but who simply will not bother to change from one material to another, memorize a lot of formulas, and vary the strengths of the mixtures. These persons want to know of some one spraying treatment which they can adopt with reasonable success, and they are willing to take slightly poorer results if by so doing they can bring the matter down to a basis of easy simplicity.

*For all such persons we recommend the Commercial Lime-sulphur at 1½ gallons to 50 gallons water, with 3 pounds of Arsenate of Lead Paste. (See pages 33 and 34.)*

If this material be used for all spraying treatments, winter and summer, it will come as near giving satisfaction as any *one* material. It is

not necessary to use the arsenate of lead in winter applications, but only when there is fruit or foliage on the trees.

This material is strong enough so that if used several times through the season it will be quite effective against the San José Scale. It gives good protection from fungous diseases; the sulphur is quite effective against sucking insects, such as plant lice and scale insects, and the arsenate makes it effective against Codling Moth, Curculio, and leaf-eating insects.

### AS TO SPRAYING PEARS.

Pear orchards generally do not require so much spraying treatment as apples, though their pests are quite similar. As a rule, two treatments will stand them in good stead—first, the winter treatment (No. 1), (if the orchard has scale), and, second, the treatment after the blossoms fall (No. 3). But the pear grower must remember that the Fire Blight, which is perhaps the one greatest enemy to the pear grower, is not reached by any spraying applications. Some pear growers do not spray at all except when special occasion arises. The Kieffer variety is generally more resistant to pests than the others, and it is seldom attacked by San José Scale.

### SPRAYING FOR PEACHES AND PLUMS.

Results from spraying peaches are less certain than with apples, but with the mixtures and methods now in use they are more certain than ever before. The control of San José Scale is relatively simple, the control of Curculio is reasonably certain, and the control of the rot is *usually* successful by the sprayings here recommended. But if the season be warm and rainy so as to wash off the spray, the Curculio and rot may be destructive despite our best efforts.

A system of spraying treatments which will give good results in almost every year is as follows:

**1. Winter Spraying.**—*Use Commercial Lime-sulphur at rate of 1 gallon to 8 or 10 gallons water (see p. 19, or pp. 33 and 34); or, if you prefer, you may make your own Lime-sulphur Wash at strength of 15 pounds lime, 15 pounds sulphur, 50 gallons water. (See p. 19, or pp. 33 and 34.)*

This treatment is for the San José Scale, which is very destructive in many peach orchards of the State. If the scale is not present, then this treatment *can* be omitted; but it has such a good general effect on the tree that it ought to be used every two or three years anyway. If the scale is present, it should be used every year. It helps against leaf-curl and rot.

**2. A Week After Petals Fall.**—*Use the self-boiled Lime-sulphur Wash (8 pounds lime, 8 pounds sulphur, 50 gallons water). and add 3 pounds of Arsenate of Lead Paste. (See page 36.)*

Notice that here we recommend the self-boiled lime-sulphur, and not the commercial material, and notice that 3 pounds of arsenate of lead paste is used to the barrel (50 gallons).

This treatment is especially for the *Cureulio*, which makes the worm at the pit, and it also prevents leaf-curl, rot, and other troubles to considerable extent.

This treatment should be given about a week after the bloom has fallen from the trees—at the time when the growing young peaches are splitting off the dried-up shuck of the bloom, when about half of the young peach shows free from the shuck. There is chance for the grower to make nice discrimination and exercise judgment in deciding the *exact* time for this application, and “a week after petals fall” is as good as we can do in general statement of the time.

**3. Two or Three Weeks Later.**—Use same as in previous treatment.

**4. About a Month Before Due to Ripen.**—Same as the previous treatment, but use no arsenate of lead.

This last treatment is needed only for Elberta and other later varieties. The varieties which ripen earlier than Elberta will usually be well protected by the three treatments before mentioned.

If arsenate of lead be used in this latest treatment, it will, from our experience, give better color to the fruit, but it is not necessary so far as *Cureulio* is concerned.

#### SPRAYING PEACHES AND PLUMS REDUCED TO SIMPLICITY.

If the grower would rather adopt merely *one* material for use on his peach and plum trees, even though the results be not always perfect, he will find that the best *one* material to use will be the *self-boiled Lime-sulphur Wash* (8 pounds lime, 8 pounds sulphur, 50 gallons water) and 3 pounds *Arsenate of Lead*. (See page 36.) The arsenate of lead need be added only for treatments when there is fruit or foliage on the trees.

This material if used three or four times during the season at the times already mentioned will give quite good protection against most of the insects and diseases which can be controlled by spraying.

The commercial lime-sulphur at 1 gallon to 60 gallons water and 2 pounds arsenate of lead might give fair results, but on this we are not certain. Present experience favors the self-boiled lime-sulphur.

#### HOW TO PREPARE THE MIXTURES.

The work of preparing spraying mixtures has been greatly simplified by the commercial sprays and washes now on the market, which are as good or sometimes better than what the grower can prepare for himself. On page 40 will be found a list of firms that deal in spraying mixtures.

#### COMMERCIAL LIME-SULPHUR WASH.

The commercial lime-sulphur washes can be bought ready-made from the manufacturers or their agents in larger towns. Most of them are of about the same strength, and can be reduced to proper strength for spraying merely by adding water.

For winter use against San José Scale use 1 gallon of commercial lime-sulphur to 8 or 10 gallons of water.

For use in spring and summer on foliage and fruit of apples, use only  $1\frac{1}{2}$  gallons of commercial lime-sulphur to 50 gallons (one barrel) of water.

Arsenate of lead paste may be added to the lime-sulphur wash and should be used at rate of about 3 pounds to the barrel. If the dry powdered form of arsenate of lead is used, use only one-half the amount, by weight. It must be remembered that the lime-sulphur alone, while excellent against fungous diseases and some insects, is not effective against Codling Moth and Cureulio; for them the poison (arsenate of lead) must be added. Dip out a pailful of the liquid and stir the arsenate in it until it is thoroughly dissolved into the solution, then pour back and stir.

#### HOME-MADE LIME-SULPHUR WASH.\*

Many growers still prefer to make their own lime-sulphur wash; therefore, we give the formula and directions for it:

Stone lime (unslaked)-----	15 pounds.
Sulphur -----	15 pounds.
Water (to make)-----	50 gallons.

Heat from 4 to 6 gallons of water to boiling over fire in large iron or brass kettle. Mix the sulphur with enough hot water to make a thin paste and pour it into the kettle with the hot water. Now add the lime, part at a time, and as it slakes dash in a little cold water as needed, to keep it from boiling over or to keep it from becoming dry. Keep the fire going and stir the mixture frequently. As the slaking ceases, keep it boiling from the fire for half an hour longer, then dilute with water (cold is all right) to make 50 gallons; strain through a fine wire screen or cloth to remove all sediment, and spray.

This wash, which contains 15 pounds sulphur to the barrel, *is only for use in winter when the trees are dormant*. It is an excellent remedy for San José Scale, but all treatments with it should be finished before the buds open in spring. The later the treatment is made the better, just so the buds are not open.

#### BORDEAUX MIXTURE.

*(Poisoned with Arsenate of Lead.)*

Let it be plainly understood that the exact position that Bordeaux Mixture should take in orchard spraying is now open to some question. It is pretty well agreed that it is better not to use it at all on peaches, and on apples only after the young fruits are well formed—say, about 1 inch in diameter or larger.

\*See note at bottom of page 19 for reference to the Home-made Concentrated Lime-sulphur.

Some growers use even as high as 5 pounds of bluestone to the barrel and are satisfied; others use 4 pounds, while some who have noticed the rusting effect on the fruit are not willing to use more than 2 pounds to the barrel. After considerable observation on our own tests and consultation with officials of the United States Department of Agriculture, we now suggest 3 pounds to the barrel to be used for any sprayings after the young apples are well set—that is, for the fourth and fifth sprayings as given on pages 29 and 30 of this BULLETIN. Some manufacturers sell ready-made Bordeaux preparations, but these have never come into general use in this State.

Stone lime (unslaked) -----	4 pounds.
Bluestone -----	3 pounds.
Arsenate of lead (paste)-----	3 pounds.
Water -----	50 gallons.

Put the bluestone in a cloth and hang it in a tub or keg of water so that it is just below the surface. In this way it will dissolve much more rapidly than if thrown in so that it sinks to the bottom. Warm or hot water will dissolve it much more rapidly than cold. Put this to dissolve the evening before it is intended to spray and it will be dissolved by morning. This should be in a wooden receptacle. After the bluestone has dissolved add water to make 25 gallons (if there is not that amount already).

Slake the lime slowly (preferably with hot water), and when completely slaked add water to make 25 gallons. Keep this in a separate keg or barrel.

We now have 25 gallons of bluestone solution and 25 gallons of the lime solution. We now take equal parts of each of these solutions and pour them together into a third tub or barrel. Do not pour a bucketful of one into a half-barrel of the other, but mix them always in equal quantities. Thus we may take two water buckets and fill one with the lime solution and the other from the bluestone solution and then pour them both at the same time into the third barrel or keg. This little point of always mixing them in equal quantities results in a better mixture than when they are carelessly mixed, or when the whole mass of one solution is poured bodily into the whole mass of the other. Always stir the solution well before dipping out, so that the liquid you take out shall be fully charged with the ingredients of the solution.

**Adding the Poison.**—The arsenate of lead paste is first dissolved in just enough water to make it liquid and is then stirred into the Bordeaux Mixture. It is then ready to apply. If the powdered form of arsenate is used, use only half the amount by weight.

**Strain Before Using.**—Before using, the mixture must be carefully strained through a cloth or fine wire gauze. Remember that all the spray must come out through the small hole in the end of the nozzle; therefore, to avoid clogging, strain carefully before using. Care in the thorough

straining before spraying will pay for the trouble many times over. If one uses considerable quantities of the mixture, it is well to have a large funnel strainer made, fitted with two nettings, one of iron wire window-screening and the other with much finer gauze, preferably of brass. Having strained the poisoned mixture, it is ready to apply.

#### SELF-BOILED LIME-SULPHUR WASH.

The tests of the United States Department of Agriculture indicate that this is the best material to use on peaches in all treatments when there is fruit or foliage on the trees. Some growers use it on apples instead of Bordeaux or commercial washes. The slaking lime does the boiling, no fire being used in boiling the wash itself, though hot water is used for slaking the lime.

Stone lime (unslaked) -----	8 pounds.
Sulphur -----	8 pounds.
Water (to make)-----	50 gallons.
Arsenate of lead paste-----	3 pounds.

Place the lime in tub or barrel and pour over it enough water to cover it (preferably hot). Put in the sulphur (lumps first crushed) and add another bucket of hot water. As the mass boils from the slaking of the lime stir it, add more hot water as needed to form a thick paste at first, and then gradually a thin paste. A sack or blanket over the barrel helps to keep in the heat. When the boiling is all over add water (cold is all right) to make 50 gallons, stir thoroughly and strain it carefully.\*

**Adding the Poison.**—Dissolve the arsenate of lead paste in enough of the solution to make it liquid, then stir it into the whole solution, and you are ready to spray. If powdered arsenate is used, use half the weight.

#### WHAT POISON—ARSENATE OF LEAD OR PARIS GREEN?

Throughout the State as a whole Paris Green is the poison most commonly used against insects. Its use is so common that everybody is more or less familiar with it, and it can be bought in almost every village. As a rule, it does reasonably well, and can be used as the poison in spraying, at the rate of about 1½ pound to a barrel of the spraying liquid.

But in recent years Arsenate of Lead has come into great favor, and all experience shows it to be so much better than Paris Green that we unhesitatingly give it first choice. The relative merits of the two may be expressed as follows:

**Paris Green** is more commonly known, is easier to get, costs less for the amount needed; but it is more likely to "burn" the leaves and fruit,

\*Directions adapted from W. M. Scott and A. L. Quaintance, Cir. No. 120, Bur. Entomology, U. S. Dept. Agriculture.

it settles to the bottom of the liquid quickly unless constantly stirred, and does not give so good results. Use about  $\frac{1}{2}$  pound to 50 gallons.

**Arsenate of Lead** is less known, is not so commonly sold, costs more to make the needed treatments; but it does not "burn" the leaves or fruit, it holds up well in the spraying liquid, sticks longer to the foliage, and gives actually better results. Experienced growers who spray now depend almost wholly on the arsenate of lead. A number of larger drug or hardware firms in our more important towns are now handling arsenate of lead.

Arsenate of lead is sold in two different forms: as a thick paste and as a dry powder. At this writing the paste form is the more common, but the use of the powdered form is increasing. As about one-half of the weight of the paste form is water, it is necessary to use only one-half as much, by weight, of the powdered form as of the paste form.

For apples use 3 to 4 pounds of the paste form of arsenate of lead to 50 gallons of spray, or  $1\frac{1}{2}$  to 2 pounds of the powdered form.

For peaches use 2 to  $2\frac{1}{2}$  pounds of the paste form to 50 gallons, or 1 to  $1\frac{1}{4}$  pounds of the powdered form.

We are often asked if the paste form can be used after it has become considerably dry and hardened. In our own work we have used this, but using a *somewhat* less amount by weight (depending upon the degree of dryness) and using special pains to see that it is all reduced to liquid in the spray solution, by working it into a moist lump in the hands and gradually working it in the liquid in our hands until it all dissolves out between the fingers, then stirring thoroughly and straining carefully.

#### THE USE OF OIL AND SOAP SPRAYS.

While we give general preference to sprays of Lime-sulphur and Bordeaux Mixture, yet there are many growers who prefer sprays containing soaps or oils, especially for winter treatments to control the San José Scale. There are a number of manufacturers who sell ready-made oil or soap sprays which are prepared merely by adding water. (See discussion of "Soluble Oils" and "Whale Oil Soap," on page 20.)

The oil and soap washes have the advantage that they are more penetrating than lime-sulphur, and on apple this is an especially good point, as the small twigs are often so fuzzy as to hinder the lime-sulphur from reaching all the scales. Also, there is less corrosion and clogging of the pumps. But, on the other hand, there is some danger to the trees (especially peach) if the soaps or oils are at all carelessly used, and they do not seem to have quite so much effect on the fungous diseases.

**Kerosene Emulsion.**—This was once the standard remedy for all kinds of scale insects and for most plant lice, and though it has been replaced by the Lime-sulphur Wash as a remedy for San José Scale, it is still used by some growers for treatments in spring or summer, when the regu-

lar winter strength of Lime-sulphur Wash cannot be freely used. It is often used against plant lice and some soft-shell species of scale insects. When carefully made and applied as a fine misty spray, it is a very effective insecticide.

*For use on Peach and Plum*, we advise that it be used at a strength not greater than 15 per cent oil for treatments in winter and early spring, and not stronger than 10 per cent oil in summer.

*For use on Apple and Pear*, it may be used as strong as 25 per cent, or even 50 per cent oil in winter and until the buds open in spring; but after the buds have opened, we advise that it be used not stronger than 15 per cent oil.

Here is the usual formula for preparing the Kerosene Emulsion, together with statement of amounts of water to be added to get 10 per cent, or 15 per cent, or 25 per cent, or 50 per cent, of oil:

Kerosene (coal oil) -----	2 gallons.
Laundry or soft soap-----	$\frac{1}{2}$ pound.
Water -----	1 gallon.

Shave the soap into thin pieces in the water and heat to boiling over fire and stir to dissolve the soap. Then *remove from the fire* and pour in the 2 gallons of oil, and churn the whole mixture together vigorously for several minutes. This may be done by pumping it through the spray pump, directing the nozzle back into the mixture so that it is sprayed back into itself again. After this whole mass has been thoroughly churned together it will be of a light creamy nature, and will then mix readily with even cold water. This gives us a total of *three* gallons, two gallons of which (or 66 per cent) is oil. To reduce this down to the proportions desired, observe the following table:

To get 10 per cent oil, add 17 gallons of water.
To get 15 per cent oil, add 10 gallons of water.
To get 25 per cent oil, add 5 gallons of water.
To get 50 per cent oil, add 1 gallon of water.

If desired, the emulsion may be prepared in less (or greater) quantity than here indicated, but care must be taken to carefully follow the *proportions* here given, so that the final mixture that is sprayed on the trees will be of the desired strength—not more and not less. It often requires a little experience and skill in making the mixture, and a thorough understanding of how much water to add to reduce the mixture to the strength desired. It must be remembered that this remedy only affects those insects that are actually wetted by it, hence the application must be very thorough.

**Soap Solution.**—For many soft-bodied insects, such as plant lice, a strong solution of ordinary soap in water is quite effectual. We do not know that the exact proportions necessary for all the different species



has been worked out, but we have used the following with excellent results against the gray Cabbage-louse, which often infests cabbage and turnips in the spring, and no doubt the same strength would be effectual against the Black Peach Aphis and the Green Apple Aphis, which often infest the young growth of peach and apple trees in spring and early summer:

Laundry soap -----	1½ pounds.
Water -----	4 gallons.

The soap should preferably be of a cheap grade which contains plenty of lye. It is shaved into thin pieces in about 2 gallons of water, which is then heated to boiling over the fire. Stir vigorously to thoroughly dissolve the soap. Then add 2 gallons of cold water (or more, if needed, so as to make 4 gallons in all) and spray while it is still warm.

This is such a simple preparation, so cheap and easy to prepare that, if needed, several applications can be made. It must be remembered that it (like the Kerosene Emulsion) only affects those insects that are actually wetted by it, hence the application must be very thorough.

We have used ordinary laundry soap and water as a remedy for San José Scale, prepared in the same way, but using 1 pound of soap to 1 gallon of water—but at this strength it should be used only in winter, or at least while there is no fruit or foliage on the trees.

### SPRAYING CHEMICALS.\*

**Lime.**—This can usually be had in any village at very cheap rates. For spraying work it should be the fresh unslaked (or “stone”) lime. If this cannot be had, the powdered air-slaked lime *can* be used, but must be carefully sifted and lumps crushed, and twice as much by weight should be used as is recommended for the stone lime. Fresh lime should cost from \$1 to \$1.20 per barrel.

**Bluestone.**—This may be had at any drug store, but can be had more cheaply by ordering in large quantity from some wholesale firm which makes a specialty of handling spraying chemicals. At retail it costs from fifteen to twenty-five cents per pound; when purchased in quantity, eight to twelve cents.

**Paris Green.**—This well-known poison can be found in most general stores in the country, where it retails at twenty-five to forty cents per pound. In quantity it can be had at cheaper rates.

**Arsenate of Lead.**—This is a newer poison than Paris Green, and is used for the same purposes. It costs less per pound (fifteen to twenty-five cents), but as much greater quantity is used, it is actually more expensive. It has the advantage, however, of not settling to the bottom so quickly, and that it can be used on very delicate foliage (such as peach)

\*The prices of materials as here given are for the general information of the reader, and refer to normal times.

without burning. It is sold by some large drug manufacturers and by those firms which specialize in spray chemicals. It is not kept by most druggists in this State, but can be ordered through the larger firms. It is sold in form of a thick white paste, or as a dry powder. Twice as much, by weight, is required of the paste form as of the powder; and on the other hand the powdered form costs about twice as much, by weight, as the paste. It is therefore largely a matter of choice as to convenience, and as to a saving of shipping charges where large quantities are to be used.

**Sulphur.**—There are two grades of sulphur: “flour of sulphur” and “flowers of sulphur.” For making the Lime-sulphur Wash the “flowers” is considered better, but either may be used. Sulphur may be ordered through any drug firm, or perhaps some general stores handle it or can order it. At retail it costs from about fifteen to twenty cents per pound, at wholesale from eight to twelve cents.

**Other Materials.**—The other spraying materials mentioned in this BULLETIN—soap, oil, etc.—can be easily procured everywhere at varying rates.

### COMMERCIAL MANUFACTURERS AND DEALERS.

Following are the names and addresses of some manufacturers of spraying chemicals:

THOMSEN CHEMICAL COMPANY, Baltimore, Md. Arsenate of Lead, Lime-sulphur, Soluble Oil, and others.

B. G. PRATT COMPANY, 50 Church Street, New York City. Oil wash known as “Sealecide.”

JAMES A. BLANCHARD COMPANY, New York, N. Y.

FRED L. LAVENBURG, 100 William Street, New York City. Arsenate of Lead, Paris Green.

VREELAND CHEMICAL COMPANY, 26 Dey Street, Hudson Terminal Building, New York City. Arsenate of Lead, Lime-sulphur.

NIAGARA SPRAYER COMPANY, Middleport, N. Y. Lime-sulphur, Arsenate of Lead, and others.

GRASSELLI CHEMICAL COMPANY, Cleveland, Ohio. Arsenate of Lead, Lime-sulphur, and others.

JAMES GOOD, 939 North Front Street, Philadelphia, Pa. Caustic Potash, Whale Oil Soap.

MERRIMAC CHEMICAL COMPANY, 33 Broad Street, Boston, Mass. Swift's Arsenate of Lead.

BOWKER INSECTICIDE COMPANY, New York, N. Y. Arsenate of Lead, and others.

POWERS-WEIGHTMAN-ROSENGARTEN COMPANY, Philadelphia, Pa. Arsenate of Lead, and others.

## SPRAY PUMPS AND APPLIANCES.

What is the best spray pump? That is a question often asked, and entirely impossible to answer with any assurance of satisfaction. Some growers get along very nicely with the small bucket pumps (if their orchards are not large), while others quickly abandon them for the larger and more powerful kinds. Some (especially gardeners and truckers) prefer the knapsack pumps, while others say that they wouldn't have one, as they are too hard to work with. Some like the compressed-air sprayers that are carried about by hand (many are in use among tobacco growers), while others object that they hold too little liquid and that too much time is required in filling the tank every few minutes.

There is just one invariable rule that can be laid down, and that one holds good regardless of whether you are rich or poor, and that is, *get a good, strong, durable pump—large enough and strong enough and with enough hose and extension pipe to reach every part of your trees with a fine, misty spray.* It is also a great advantage if the pump has an agitator for keeping the liquid stirred so the ingredients will not settle to the bottom.

**Barrel Pumps for Standard.**—Considering *everything*—the cost, the durability, the capacity, the labor we have, the kinds of fruit and the size of our orchards, we believe that for the majority of our people who have or are planting orchards for market purposes the barrel pumps are best, and should be generally considered as the standard. Those with orchards of 1,000 or more apple or 3,000 or more peach may profitably get more elaborate outfits, while those with only about 100 apple or 200 peach (or less) may do all right with the smaller pumps.

A good barrel pump, with two leads of hose, extension pipes, double nozzles, stopcocks, etc., will cost, complete and ready for use, about \$25 to \$35. It is usually better to order that the pump be fitted into the *side* of the barrel. If you get the pump alone

and fit it into the barrel yourself it will cost less.

Our illustration (Fig. 9) shows a good general type of barrel outfit. It is preferable, however, to have one fitted so that the pump is outside

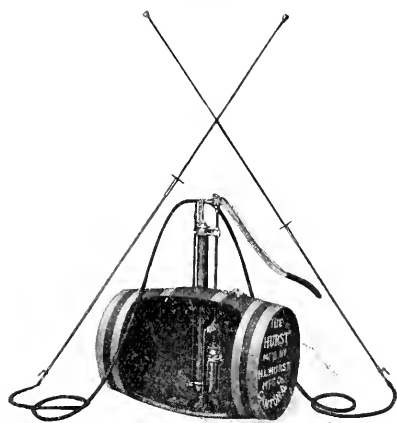


FIG. 9.—Barrel pump fitted in side of barrel with two leads of hose, two extension rods, each with stopcock at base and double nozzles at end. A good general type of barrel outfit for commercial orchards of moderate size. (After Hurst Mfg. Co.)

of the barrel. Every such change or modification, for better or worse, must be expected to add to, or lessen, the cost accordingly.

**Appliances.**—Aside from selecting a good pump, you must also decide how much *hose* you want, how long an *extension pipe* will be needed, and the kind of *nozzle*. You must also state that you want whatever *connections, washers, etc.*, will be needed to put the entire outfit in condition for use. It will also be an advantage to have a *stopcock at base of the extension pipe*, so the spray can be cut off at any moment to prevent waste. All these little appliances add more or less to the cost, but a suitable arrangement of them is the very making of a satisfactory outfit.

For bucket, knapsack and compressed-air pumps, from six to ten feet of extra hose is enough, but for barrel pumps we advise at least fifteen feet of extra hose. The extension pipe should be six to ten feet long, according to the size of trees. We prefer a nozzle which throws a cone-shaped spray and which is set *at an angle* so as to permit greater range of work. Many of these details the grower must settle for himself by a study of the catalogues, or from individual experience.

### MANUFACTURERS AND DEALERS IN SPRAY PUMPS.

It will be well to write to any or all of the following firms and ask for their illustrated catalogues and price-lists of spraying outfits, study them carefully, figure on the length of hose, extension pipe, etc., before placing your order.

A few hardware firms in this State carry spray pumps in stock.

SYDNOR PUMP AND WELL COMPANY, Richmond, Va.

GOULDS MANUFACTURING COMPANY, Seneca Falls, N. Y.

FRIEND MANUFACTURING COMPANY, Gasport, N. Y.

HURST MANUFACTURING COMPANY, Canton, Ohio.

MORRILL & MORLEY, Benton Harbor, Mich.

E. C. BROWN COMPANY, Rochester, N. Y.

SPRAMOTOR COMPANY, Buffalo, N. Y.

### SPRAYING DEMONSTRATIONS—Proof of Value of Spraying.

For several years the Divisions of Entomology and Horticulture of the State Department of Agriculture have conducted jointly a series of public demonstrations in the spraying and pruning of orchard trees—especially apples. This account has to do only with the spraying, which is done by the Division of Entomology.

These demonstrations have now been repeated in so many years, and in every section of the State (east, middle, and west), until the general results cannot possibly be a matter of chance, and these results prove beyond dispute that the spraying of apples is profitable in all sections of the State.

These demonstrations were made in the orchards of actual growers, and were advertised so that all who desired could be present and learn exactly how the work was done. A barrel spraying outfit was taken to each place, and the spray mixtures were made up in the presence of the audience. In each case three or four trees of good bearing size and age were selected and all treatments were given exactly as should be done in regular orchard practice. Not a single thing was done nor a single implement used that is not entirely practicable for the ordinary fruit grower of moderate or small means. We simply put science to the test on a practical job, and it justified the claims made for it.

At most places one tree was sprayed on only one side, the other side receiving only what was accidentally blown or thrown upon it. This was to see if we could demonstrate the difference between the sprayed and unsprayed halves of the same tree. In most cases we have carried the work through two or three sprayings, but in others gave only the one treatment to show how the work was done.

Out of all the demonstrations that were followed out there were only two that failed to give noticeably good results, these being at Mocksville, Davie County, and Rutherfordton, in Rutherford County, both in 1909.

**Where Work Was Done.**—The places at which demonstrations were made, followed by later treatments (including 1912), and from which we received reports by the owners, are listed below. In addition to these, we have given single demonstrations (not followed by later treatments) at a number of other places. This does not include demonstrations since 1912.

County.	Locality.	Owner of Orchard.
Alamance.....	Burlington, R. 7.....	L. W. Holt.
Alexander.....	Poors Knob.....	R. B. Lowe.
Bertie.....	Aulander.....	C. H. Warf.
Cabarrus.....	Concord, R. 5.....	G. F. Barnhardt.
Caldwell.....	Lenoir.....	J. A. Dula.
Caldwell.....	Lenoir, R. 3.....	S. N. Swanson.
Caldwell.....	Adako.....	J. T. Perkins.
Catawba.....	Hickory.....	L. J. Yount.
Cleveland.....	Shelby.....	L. S. Hamrick.
Cleveland.....	Casar.....	Zero Mull.
Davie.....	Mocksville.....	J. D. Hodges.
Guilford.....	Greensboro, R. 1.....	D. W. Ramseur.
Henderson.....	Dana.....	Jonathan Case.
Iredell.....	Mooresville, R. 1.....	H. C. Johnston.
Jackson.....	Sylva.....	George P. Miller.
Johnston.....	Clayton.....	W. T. Stallings.
Lincoln.....	Reepsville.....	D. C. Warlick.
McDowell.....	Old Fort.....	H. M. Croom.
Mitchell.....	Spruce Pine.....	H. F. Lawrence.
Robeson.....	Red Springs.....	W. M. Roberts.
Rowan.....	Salisbury.....	M. J. Bost.
Rutherford.....	Rutherfordton.....	M. O. Dickerson.
Scotland.....	Laurinburg.....	W. DeB. McEachin.
Stanly.....	Albemarle, R. 3.....	Dr. D. P. Whitley.
Stokes.....	King.....	J. W. Spainhour.
Yadkin.....	Courtney.....	D. T. Reavis.
Yancey.....	Bald Creek.....	C. L. McPeters.

In the fall, we wrote to each of these persons, asking for their observations and opinions of the results. The following is a fair sample of the letter which we sent to all, and it will be noted that our letter was so expressed as to draw *the same kind* of statement from all; this was done so that we could *fairly compare* the reports.

(*Letter Asking Results of Demonstration Spraying.*)

RALEIGH, N. C., November 3, 1911.

MY DEAR SIR:—As the season is now at a close, we desire to know the result of the work in spraying apples at your place this year. Please, therefore, write me as soon as convenient, stating what difference there was between the sprayed trees and the unsprayed ones, both as to quantity and quality of fruit and foliage. Also please indicate whether you notice any difference in the two halves of the tree which was half sprayed.

I inclose envelope for your reply, also circular which gives a number of these reports for previous years, so you can see the kind of information we want. We want to know exactly how it resulted, whether favorable or not.

Very truly yours,

FRANKLIN SHERMAN, JR.,  
*Entomologist.*

**Results.**—Following are the reports made by these growers. Bear in mind that in no case did we give more than three sprayings, and had it been practicable for us to give a summer spraying the results would doubtless have been even better than here shown.

(ALAMANCE COUNTY) BURLINGTON, N. C., October 20, 1909.

DEAR SIR:—The foliage on the sprayed trees is green and fresh, while on the others there is scarcely a leaf. On the tree that was half sprayed the fruit was twice as large and perfect, while on the unsprayed side it was small and inferior. It did not look as if there could be so much difference. Many have noticed the difference in passing and asked the cause. I am convinced, and so are others, that we will have to spray.

Very truly,

L. W. HOLT.

(ALEXANDER COUNTY) POORS KNOB, N. C., October 13, 1908.

DEAR SIR:—Your work here was very satisfactory, as the foliage is yet green, while the trees near by that were not sprayed have lost most all their foliage. The fruit is much larger and nicer and less infested with worms. The half tree that was sprayed is bright and green and the fruit is fine, while the opposite side (not sprayed) has lost very near all its foliage. All parties that have seen those trees say there is a great difference between the trees that were sprayed and the ones that were not. \* \* \*

Very truly yours,

R. B. LOWE.

(BERTIE COUNTY) AULANDER, N. C., November 23, 1909.

DEAR SIR:—The apples on the sprayed trees were some larger and about 40 per cent better than the others, and on the half-sprayed tree the part that was sprayed was at least 75 per cent better than the unsprayed part.

C. F. WARF.

(CABARRUS COUNTY) CONCORD, N. C., November 25, 1912.

DEAR SIR:—Your letter received. The results were simply wonderful. The apples were larger than previous years, and very uniform in size, sound as a dollar and hanging on the trees until picked off just before the first killing frost.

The foliage remained perfectly green until killed by frost early in November. The difference on the tree sprayed on one side was also very marked—the apples on the unsprayed part being very inferior, dropping off in July and August, while those on the sprayed part of the tree remained until picked just before frost.

Yours very truly,

G. F. BARNHARDT.

(CALDWELL COUNTY) LENOIR, N. C., October 7, 1908.

MY DEAR SIR:—In regard to the apple trees your department sprayed last spring and summer. The foliage is still (October 7) green and healthy, and the apples still hanging on the trees, sound and free from worms and bitter rot.

The variety sprayed is my seedling, Dula Beauty. One-half of one tree was sprayed and the other half, which was not sprayed, shed its leaves and fruit more than three weeks since, and the fruit is on the ground rotten; and that is the condition of a large part of my orchard. I hope that the demonstration on my place will emphasize the importance of spraying to obtain sound fruit. It is no longer an experiment.

Respectfully,

J. A. DULA.

(CALDWELL COUNTY) R. 3, LENOIR, N. C., November 7, 1911.

DEAR SIR:—Your work here was very satisfactory. The foliage is still green and healthy, and the apples still hanging on the trees, while the unsprayed trees near by have lost their foliage and the fruit did not amount to anything. All persons who have seen those trees say there is a great difference between the trees that were sprayed and the ones that were not.

Yours truly,

S. N. SWANSON.

(CALDWELL COUNTY) ADAKO, N. C., October 6, 1910.

DEAR SIR:—Your work here was very satisfactory, as the foliage is yet green, while unsprayed trees have lost most all their foliage. The fruit is much larger and nicer and less infested with worms. The half tree that was sprayed is bright and green and the fruit is good, while the side not sprayed has lost all its foliage. Most every one that was here at the demonstration and have watched the trees say they are going to get spraying outfits for next year.

With best wishes, etc.,

S. O. PERKINS (for J. T. PERKINS).

(CATAWBA COUNTY) HICKORY, N. C., November 17, 1909.

DEAR SIR:—The apples (Limbertwigs) have been gathered, and I am sure that the trees that were sprayed gave more apples and better apples than the unsprayed trees, and held a green foliage longer. The apples were almost free from worms and did not rot near so bad as the apples of the unsprayed trees. They were very much improved in color and size.

Yours truly,

L. J. YOUNT.

(CLEVELAND COUNTY) SHELBY, N. C., December 10, 1909.

DEAR SIR:—Your work here was very satisfactory, as the foliage on November 15th was green on the trees that were sprayed, while the unsprayed trees had shed their foliage. The Shockley tree that was sprayed held its fruit

much better and it was smoother and much larger than the (unsprayed) tree near by. The tree that was half sprayed showed marked difference—the fruit on the sprayed side was smooth and much larger, while on the side not sprayed the fruit rotted and was shedding all summer.

L. S. HAMRICK.

(CLEVELAND COUNTY) CASAR, N. C., November 12, 1911.

DEAR SIR:—I beg to state that the sprayed trees did not have more than a dozen apples on them, but of a better quality than the unsprayed trees and unsprayed half-tree. Yes, quite a difference in fruit and foliage of sprayed and unsprayed trees.

ZERO MULL.

(DAVIE COUNTY.)

(NOTE.—This is one of the few where no special benefit was noticed.)

MOCKSVILLE, N. C., October 23, 1909.

DEAR MR. SHERMAN:—The tree fully sprayed had no fruit on it. The foliage appeared to be fresher green than the unsprayed until late in September, when I expected the difference to be more manifest, but I could scarcely detect any difference.

The tree half sprayed was a winesap full of fruit. There was some apparent difference in favor of the sprayed half until late in season, when there seemed to be little or none. The apples on both the sprayed and unsprayed parts were good and free from worms.

Yours truly, J. D. HODGES.

(GUILFORD COUNTY) R. I. GREENSBORO, N. C., November 12, 1909.

DEAR SIR:—The apple trees sprayed on my place showed a decided improvement; the Ben Davis was the finest I ever saw, so full, nearly free from rot, and hung on so long, while the fruit on the unsprayed tree right by it rotted and fell off so that we got scarcely any good from them. The Winesap, however, had no fruit, but the foliage was greener and more free from brown spots. The neighbors seemed very much interested in the work all summer.

Respectfully,

D. W. RAMSEUR.

(HENDERSON COUNTY) DANA, N. C., November 11, 1908.

DEAR SIR:—The Limbertwig apples have been gathered and marketed, and I am sure that the trees that were sprayed gave double the real value that three other corresponding ones (unsprayed) gave. More apples and better apples are the result.

The trees held a green foliage for about three weeks longer than those that were not sprayed, and the apples were almost free from worms and defects. The color was very much improved and the size larger and almost twice the number of bushels on the trees sprayed than there were on the same number of other trees not sprayed, of the same varieties, and grown under the same conditions.

Yours very truly,

JONATHAN CASE.

(IREDELL COUNTY) MOORESVILLE, N. C., November 20, 1911.

DEAR SIR:—One of the two sprayed trees died from lightning—the other one retained fruit to ripen—not a good crop, but good for this year as we had very little fruit. The one half-sprayed had some fruit on treated half—the other half nearly dead, no fruit at all, foliage not half as large, nor as much of it, nor as vigorous.

I am firmly convinced that it pays to spray. Will try the lime and sulphur in the spring.

Yours,

H. C. JOHNSTON.



(JACKSON COUNTY) SYLVA, N. C., October 8, 1908.

DEAR SIR:—The sprayed apple trees show the benefits of spraying more definitely now than they did in July. At this date (October 8) the foliage and fruit are far better than other trees (unsprayed) of the same variety near by.

We have had several hard frosts this month, yet the foliage is still green, luxuriant, and dense; the apples are cleaner, larger, and still growing. The sprayed trees are very much better in every way.

Yours respectfully,

GEORGE P. MILLER.

(JOHNSTON COUNTY) CLAYTON, N. C., November 23, 1909.

DEAR SIR:—The foliage is still large on the trees that were sprayed. On the tree that was half-sprayed the sprayed foliage is large, while on the unsprayed half there is scarcely any. The fruit was some larger and the yield was some greater. The tree whose fruit has always rotted did not have many, but they remained until they ripened; the fruit was smooth and nice, and I am well pleased with the spraying.

Respectfully,

W. T. STALLINGS.

(LINCOLN COUNTY) REEPSVILLE, N. C., October 14, 1909.

DEAR SIR:—The tree that you sprayed all over was not a fair test, as part of it died this summer and the other part is not healthy. The tree that was half sprayed and half not shows marked difference, the leaves on sprayed side being green and more free from rust than the unsprayed. We gathered some as fine Blackburns off a tree that you sprayed as I ever saw, and they had no worms. Everybody that has seen the apples off sprayed and unsprayed trees say that it pays to spray. The people around here have taken an interest in spraying their fruit trees.

Very respectfully,

D. C. WARLICK.

(McDOWELL COUNTY) OLD FORT, N. C., November 23, 1909.

DEAR SIR:—Have waited for full developments to report, and have asked several neighbors and friends to express opinion, and they readily agree with me that there is profit in spraying apples. Apples are prettier, larger, and smoother than before. The tops of the trees not reached did not have as nice fruit. Leaves kept green longer than on the other trees. The greatest difference was seen in the tree only sprayed on one side, both as to fruit and foliage. Neighbors have asked for apples to show inquirers. All are pleased with results. The fruit is much nicer.

Yours truly,

H. M. CROOM.

(MITCHELL COUNTY) SPRUCE PINE, N. C., October 24, 1909.

DEAR SIR:—Our fruit was a total failure (frost and freezes), only one apple from about 200 trees. I could see a slight difference in foliage of trees sprayed; it seemed a little darker than on the unsprayed. There are no good apples within eight miles of this place this year.

Yours truly,

H. F. LAWRENCE.

(ROBESON COUNTY) RED SPRINGS, N. C., October 23, 1909.

DEAR SIR:—The foliage on sprayed trees is green now; on the other trees about all off. The fruit stayed on until ripe and we used it. [Had always rotted prematurely before.—F. S.] The apples on the half-tree that was sprayed were about twice as large as on the half unsprayed, and were more free from worms, rot, and better in every way. I certainly think spraying pays.

Yours, etc.,

W. M. ROBERTS.

(ROWAN COUNTY) SALISBURY, N. C., October 22, 1910.

SIR:—The tree that was half sprayed the apples are larger and the foliage seemed to stay on better. The apples did rot considerably, but not as bad as on the half not sprayed. As to the others, the leaves stayed on better, but I can't tell any difference in the apples—they rotted as bad as ever, but I didn't think they were as wormy as in other years.

Yours truly,

M. J. BOST.

(RUTHERFORD COUNTY.)

(NOTE.—This is another of the few cases where no noticeable benefit was reported.)

RUTHERFORDTON, N. C., November 22, 1909.

DEAR SIR:—I am sorry to have to report that I see no benefit derived from the spraying. It might have been owing to the late spring frost or other natural cause that I am unable to account for.

Yours very truly,

M. O. DICKERSON.

(SCOTLAND COUNTY) LAURINBURG, N. C., December 10, 1909.

DEAR SIR:—The tree that was half sprayed died and the fruit did not mature. I can only say that the foliage on the sprayed half was better, and the fruit—what there was of it—was larger and healthier than the rest. The part that was sprayed was the last to die. The other small tree died out completely, and bore no fruit at all. The large tree was all right and as pretty as you ever saw, but had only a very few apples on it, but these were nicer than it ever bore before. This tree is living and looks well. The trees in the orchard were beginning to blight when you came, and it seems that you struck the wrong ones. The large tree held its fruit until it was fully ripe—something it never did before.

Very truly,

W. DEB. McEACHIN.

(STANLY COUNTY) R. 3, ALBEMARLE, N. C., October 13, 1910.

MY DEAR SIR:—The Winesap apple tree that you sprayed for me still has several bushels of nice apples on it, the leaves still have the rich, healthy color, while another Winesap tree of same age standing beside it (not sprayed) shed all its apples more than a month ago.

The tree which was half sprayed showed a marked contrast in quality of fruit; also, there is quite a contrast in foliage. I have a spraying outfit, and intend to spray thoroughly next year.

Thanking you,

Yours truly,

D. P. WHITLEY, M.D.

(STOKES COUNTY) KING, N. C., October 7, 1908.

DEAR SIR:—The foliage and fruit on the Winesap trees were fine—the fruit almost perfect, and the foliage at this writing (October 7th) is fresh and green. On the Maiden Blush tree the fruit was fine, but did not keep as well as it should have done. I sold three bushels to a canner, and they told me these were the only apples they found with no worms in them. Foliage on this tree is now fresh and green. Two other trees of the same variety, right near the one sprayed, have foliage all off, and did not get an apple from either one fit to use.

The Magnum Bonum tree—half sprayed and half not—showed marked difference in the fruit on the sprayed side; the fruit on the side that was sprayed was much larger and finer. The foliage on that side is now fresh and green; on the side not sprayed, nearly all off.

Respectfully yours,

J. W. SPAINHOUR.

(YADKIN COUNTY) COURTNEY, N. C., November 14, 1911.

DEAR SIR:—I noticed no difference in the quantity of apples but vast difference in quality. Fully 90 per cent on sprayed Ben Davis tree ripened without specking, free from worms, while not 10 per cent of them matured on unsprayed trees. The same was true of the half-sprayed tree. The foliage remained green on sprayed trees until killed by the late freeze, while unsprayed trees were barren of their foliage. Had I spent \$40 or \$50 for spraying material and work I would have realized several hundred dollars from my orchard this season, whereas I only received a few dollars.

Respectfully,

D. T. REAVIS.

(YANCEY COUNTY) BALD CREEK, N. C., October 27, 1910.

DEAR SIR:—I can truly say there is no comparison between the sprayed trees and those not sprayed. The bulk of my apples were killed by the last freeze in spring. Where we did not spray they almost all fell off, and what did not were spoiled by scab; on the trees that were sprayed, what fruit was not killed by the freeze hung on well and was smooth and nice, with few defects, and the foliage is still green. Same on the half-tree that was sprayed, while the half not sprayed the leaves and apples both dropped off. I am fully satisfied. The only road out is to continue to spray—and spray heavy at that.

With best regards,

Yours, etc.,

C. L. MCPETERS.

**Discussion of These Results.**—It will be seen that of all the reports only two or three indicate disappointment, and the two things which proved most troublesome to the tests were the late frosts and the tendency of apples to rot in early fall. The rotting of fruit in early fall can be controlled largely by summer spraying, as indicated on page 30. But in all of these demonstrations we have depended only on spring treatments, and have never given a summer spraying. The latest date on which any of the trees in these demonstrations were sprayed was May 29 (at Old Fort, in 1909). We cannot expect a spraying given at that early date to completely protect the fruit from rot in late August and September, so that occasional partial failure on that point is to be expected. Yet even with these spring treatments the majority of reports show that the sprayed apples rotted very much less than those not sprayed.

The two men who report absolutely no noticeable benefits are Mr. J. D. Hodges, of Mocksville, and Mr. M. O. Dickerson, of Rutherfordton, both in 1909. It may be that we did not reach these places at just the right time to give the treatments to best advantage. Many of our sprayings have been given either just before, during, or immediately after heavy rains. In this matter of hitting *exactly* the right time, the fruit grower on his own place can do better than we, who must make our trips to suit a number of different varieties in different localities. Only two complete failures from so many tests is very gratifying.

Then, too, these few failures will serve to show us that spraying isn't *perfect*—that it won't do everything. There will come times when the apples will rot or the Codling Moth will be destructive in spite of the

most careful spraying. We must acknowledge some limitations. But the great point is that, taken year after year under all sorts of conditions, spraying can generally be relied upon to protect our trees and fruits from the majority of their enemies—and the results are very, very profitable.

The persons who made report were all persons who had not been in the habit of spraying, and most of them had never before seen a spray pump in use. That they were fully convinced is shown by the fact that a number of them have since bought up-to-date spraying outfits and are now spraying their trees regularly.



FIG. 10.

PART OF EXHIBIT OF DIVISION OF ENTOMOLOGY, STATE DEPARTMENT OF AGRICULTURE, AT  
STATE FAIR, RALEIGH, N. C., OCTOBER, 1913.

## PART III.

## ORCHARD PROTECTION.

In the first part of this BULLETIN we discussed the San José Scale and the methods of controlling it, and this puts the matter in such shape that any grower can control this pest.

In the second part we discussed the whole general subject of orchard spraying, and the methods outlined will control most of the orchard pests that can be controlled by spraying.

It now remains for us in this third part of this BULLETIN to show the work that is being done for the general *protection* of our orchards, that is to *find* the San José Scale where it does exist, to ascertain its prevalence, to show the conditions to the growers, and, so far as practicable, to *prevent* needless spread of serious troubles.

## ORCHARD INSPECTIONS.

The prevalence of the San José Scale in many parts of the State, and the great harm that it often does before it is discovered by the grower, plainly indicate the value of maintaining a systematic inspection of the commercial orchards of the State. Accordingly the Board of Agriculture, at its regular meeting in December, 1906, provided for the employment of an assistant in the Division of Entomology to be especially assigned to the work of inspecting the orchards and nurseries of the State.

The work was begun in February, 1907, with Mr. L. M. Smith as inspector, and he continued until September, when he resigned. He was succeeded by Mr. S. C. Clapp, of Guilford County, who has continued since that time. Only a part of Mr. Clapp's time is given to orchard inspection work, as his duties include also the inspection of nurseries, and some work on the Department Test Farms, and in past years he has done much of the demonstration spraying already described.

**Object and Methods of Work.**—The object of this work is to assist our fruit growers to discover serious insect pests, if they are present, and to give timely suggestions for treatment of trees *before* the trees are fatally injured.

The Inspector carries a blank book, in which a separate sheet is filled out for each orchard inspected. These are sent in to the office, and when San José Scale is found full information and suggestions are sent to the owner of the orchard. The Inspector does not examine every tree, but the orchard is walked through in several directions, a few limbs being examined here and there throughout. Both the fruit-grower and the Inspector ask and answer questions freely. The grower is told how to prepare spray mixtures, when to apply them, etc. He is shown the de-

structive work of borers, and how to lessen their ravages. He is shown the work of Codling Moth and Curculio and advised in their control. If the Inspector finds the San José Scale, the grower is taught to know it, and the methods of combating it are explained. Incidentally, much information is given about pruning, varieties of fruit, etc. While it may happen that scale may be present and overlooked, yet the grower may know that if it were at all widespread and doing damage it would *likely* be found, and he is therefore relieved of present anxiety if it is not found.

**Results.**—We have been able to see some very decided and beneficial results from this work. In very many cases we have been able to find the San José Scale in time to give the owner opportunity to treat it before serious injury is done. A letter from western Catawba County, where Mr. Clapp spent several days inspecting, says: "There will be fourteen new sprayers put into use in this section this year that I know of." A letter received from Mount Airy, where we have done considerable inspection work, says: "There is much more spraying being done than formerly—fully ten times as much as in any previous year." Even from one of the eastern counties where there is very little fruit grown for sale we received a letter which said that a considerable number had started spraying. Each spring we find unmistakable evidence that more spraying is being done than in the years before. This is the sort of evidence that *counts for something*, and it must mean much to our fruit industry if the spraying is thoroughly done, at the right times, and with the proper materials.

**Summary of Orchard Inspection Work.**—The following table gives in condensed form an account of the orchard inspection work to May, 1915, showing the number in which San José Scale was found, etc.:

DATA ON ORCHARD INSPECTIONS, TO MAY, 1915.

County.	Premises Inspected.	San José Scale Found in—	Total Trees in Orchards Inspected.	Apple.	Peach.	Pear.	Plum.	Cherry.	Nuts and Miscellaneous.
Alamance.....	24	20	9,236	4,200	3,065	1,611	172	164	24
Alexander.....	21	4	20,416	19,475	725	16	87	113	-----
Ashe.....	1	-----	300	300	-----	-----	-----	-----	-----
Avery.....	15	5	8,002	6,315	650	98	629	270	40
Beaufort.....	5	2	7,038	754	6,115	72	31	10	56
Brunswick.....	5	1	1,033	213	110	675	12	-----	23
Buncombe.....	23	10	20,973	12,655	7,498	161	204	292	163
Burke.....	12	9	8,225	6,183	1,579	128	109	194	32
Cabarrus.....	14	13	3,758	1,290	2,105	196	78	89	-----
Caldwell.....	21	14	7,568	6,830	551	61	52	74	-----
Carteret.....	1	1	4,650	250	3,000	800	100	-----	500
Caswell.....	1	-----	356	120	225	3	1	6	1
Catawba.....	58	53	12,361	4,451	5,725	1,610	217	331	27
Chatham.....	2	1	312	125	125	28	28	2	4
Cherokee.....	5	1	4,786	2,425	2,100	14	225	10	12
Chowan.....	1	1	64	30	30	3	1	-----	-----
Cleveland.....	36	27	9,456	3,442	3,831	1,788	145	228	22
Craven.....	2	1	1,702	720	800	150	13	4	15

## DATA ON ORCHARD INSPECTIONS, TO MAY, 1915—CONTINUED.

County.	Premises Inspected.	San José Scale Found in—	Total Trees in Orchards Inspected.	Apple.	Peach.	Pear.	Plum.	Cherry.	Nuts and Miscellaneous.
Cumberland	9	9	6,283	865	4,940	120	283	66	9
Davidson	1	1	656	50	450	150		6	
Davie	2	1	2,170	550	1,250	270	100		
Duplin	4	4	3,860	375	3,400	50	35		
Durham	31	31	8,950	2,987	4,895	668	168	166	66
Edgecombe	7	6	5,159	870	3,481	296	12	50	450
Forsyth	4	2	4,510	2,200	1,310	875	45	80	
Gaston	38	37	15,327	6,105	4,935	3,176	360	574	177
Granville	3	2	3,947	2,800	625	154	13	40	315
Guilford	74	67	33,413	11,956	15,082	5,174	719	419	63
Halifax	1		2,400	100	2,200				100
Harnett	7	6	1,397	790	395	52	153	3	4
Haywood	60	24	106,591	97,325	9,084	117	44	21	
Henderson	13	6	18,230	15,855	1,855	271	195	54	
Hoke	2	2	640	460	75	19	5	10	71
Iredell	19	14	7,317	3,520	2,350	1,021	86	90	250
Jackson	14	5	15,600	15,500	100				
Johnston	11	11	2,040	1,140	694	79	75	2	50
Lee	4	4	706	425	265	13	3		
Lenoir	6	5	3,707	1,005	1,240	914	296		252
Lincoln	3	3	821	175	630	12	4		
Macon	26	3	22,945	19,465	2,789	207	254	198	32
McDowell	11	6	4,774	3,890	734	85	18	38	9
Mecklenburg	9	8	7,715	1,225	6,025	100	73	266	26
Mitchell	19	2	8,483	8,225	152	2		104	
Montgomery	14	13	48,595	74	48,506	5	10		
Moore	12	11	86,311	1,735	80,275	1,982	2,017		302
Nash	4	2	2,819	2,260	460	12	52	31	4
New Hanover	2	2	88	5	15	62	4	1	1
Orange	10	7	3,796	1,785	1,695	215	35	47	19
Pender	1	1	2,081	3	2,000	1	12	5	60
Polk	4	3	3,727	2,040	962	535	175	15	
Randolph	4	3	4,493	1,450	1,375	1,618	50		
Robeson	3	3	746	56	335	40	300	15	
Rockingham	32	28	17,684	10,028	2,147	2,075	85	66	33
Rowan	6	6	1,269	585	535	59	25	53	12
Rutherford	10	4	16,276	8,100	6,860	1,016		300	
Sampson	2	1	10,600	10,100	500				
Stanly	3		1,590	950	600	10	18	12	
Stokes	7	4	5,302	1,925	3,105	239	16	16	1
Surry	67	51	57,284	45,890	9,947	619	118	249	11
Swain	8	1	6,950	6,950					
Vance	4	3	7,963	450	7,225	173	45	36	34
Wake	2	2	209	90	100	5	2	12	
Warren	1	1	880	800	40	25	15		
Watauga	28	4	45,630	44,825	576	57	39	133	
Wayne	3	2	2,185	1,575	215	93	275	25	2
Wilkes	36	6	34,195	30,700	3,325	15		155	
Wilson	10	7	4,639	1,000	3,147	58	30	3	401
Yadkin	18	14	50,668	12,730	13,435	12,112	1,070	484	10,837
Yancey	17		22,185	21,475	710				
69 counties	933	601	846,042	475,217	295,280	42,265	9,438	5,632	14,510

NOTE.—In the counties of Rockingham and Surry a few of our records show only the "total trees," without indicating the number of each kind, hence "cross-checking" of the data may show apparent inconsistencies. This also affects the grand totals at foot of table.

**Explanation.**—Let us be sure that the reader understands the get-up of this table. The first county on the list is Alamance, and in that county 24 different premises have been inspected, of which 20 showed more or less San José Scale on the fruit trees. The total number of orchard trees on the 24 premises was 9,236, as follows: Apple 4,200; peach 3,065; pear 1,611; plum 172; cherry 164; and of apricots, damsons, nuts, and the like, 24.

Thus one can easily see how much inspection work has been done in any county, can see what proportion of the places were found to be infested with San José Scale, and can get an idea of the kinds of fruit that are most grown in the different counties.

Considering the whole number of orchards inspected in the State, we find that a fraction over 64 per cent were found to have the San José Scale.

Going over these figures with Mr. Clapp (who has done the great bulk of the inspection work), we conclude that in 23 counties we have done enough inspecting to be fairly sure of their general condition; and in these 23 counties our records show that San José Scale was found in a fraction over 63 per cent of the orchards.

It will be seen, however, that the prevalence of scale varies greatly in different sections.

A number of our largest orchards have been inspected several times, but in our tables we have counted each only once.

**A Large Task.**—While the figures given in the table may look dull and uninteresting, yet they represent a large amount of work, both by the Inspector in the field and by the Entomologist and clerk in the office. It means that thousands of trees have been carefully examined, that hundreds of miles have been tramped over hill and swamp in the inspections, that hundreds of reports have been filled out and mailed to the office, that hundreds of letters have been written, and that thousands of circulars and bulletins have been sent to the growers. And it is in order that we may do more of this work in counties where we now know of few (or no) commercial orchards, that we want all interested persons to put themselves into communication with this office.

### SUGGESTIONS TO PURCHASERS OF NURSERY STOCK.

It is well for persons who intend to buy trees (especially if they are planting large orchards) to take such precautions as they can to get only good healthy trees. Much of the trouble with unprofitable orchards arises from the fact that inferior or diseased trees are planted, and as little or no attention is given them, they soon decline or perish altogether. The following information should be of interest to prospective planters:

**Nursery Inspection.**—The laws of North Carolina require that all nurseries in the State be inspected each year. The object of these inspec-



tions is to ascertain the condition of the nurseries with regard to certain serious insect pests and plant diseases, and to prevent, so far as may be practicable, the sale of infested trees. The actual work of inspection is done by the Entomologist or his assistants.

**San Jose Scale.**—The one pest above all others which the nursery inspections are intended to control is the San José Scale, a small, inconspicuous insect which does great damage when it becomes established in orchards. If a tree is infested with this insect at the time it comes from the nursery, it may show no signs of decline *then*, but it will usually die in from one to four years, and during that time the insect is likely to become established on neighboring trees. As the San José Scale is not easily observed until the trees have become badly infested, it can be readily seen that every precaution should be taken that infested trees shall not be sent out from the nurseries, and the grower himself should exercise every care to see that infested trees are not sent to him.

**Certificate Should Accompany Every Delivery.**—Every delivery of nursery stock sent to any purchaser in this State is required by law to be accompanied by a certificate of inspection, which states that the nursery from which the stock was sent has been inspected and is apparently free from the San José Scale, or other dangerous pests. The wording of the certificate is usually printed on a card or shipping tag and attached to the box or bundle. And the certificate must bear the name (either written or printed) of the State Entomologist, State Horticulturist, State Nursery Inspector or other duly qualified officer of the State, or State Experiment Station, where the nursery is located.

**Requirements for Certification.**—While the certificates issued in all the States indicate that the nursery is "apparently free from San José Scale," etc. (or words to that effect), this cannot be taken as a guarantee that it is free, for the reasons which we have already explained. It may be that not one of the individual trees in the shipment was actually inspected, as the most that the inspector can do is to go into all parts of the nursery and inspect occasional trees or groups of trees. And the statement that the nursery "is apparently free" is not to be taken literally. So far as we know, there is not a single eastern State in which real close inspections are actually made which carries out to the letter the idea implied in that statement. If only one or two, or a few scale-infested trees are found, it is a usual thing to destroy those trees, closely inspect all around them, and if no more scale is found, the certificate is issued. In some States a further precaution is taken, in that the inspector or his agent personally does the work of fumigating (explained later) the stock when it is dug. In some cases, where the nursery is not too large, and the infestation is quite bad, arrangements are made to have the inspector or his agents inspect every individual tree when the stock is dug. By these various means the purchaser receives considerable pro-

tection, though of course it is not perfect. Despite the fact that the wording of the certificate cannot be relied on literally to the letter, it is perhaps best to have the wording as it is, for a nurseryman will know that his nursery must be kept reasonably free, at least, in order to get a certificate entitling him to do business. It frequently happens that an entire field or block of nursery stock is found to be so generally infested that the whole lot has to be condemned and destroyed before the nursery can receive a certificate to do business. But when a man is conducting an honest nursery business, is exercising every possible precaution, and is really doing a good work for the fruit-growing industry, then we do not believe it to be fair to him, or needful for the public good, to put him out of business by withholding his certificate when a very, very small proportion of his trees have the San José Scale. It is a pest which each individual purchaser of fruit trees should watch for, and if he will use the precautions here suggested he will greatly reduce the chances of getting the scale from the nursery. Of course, it might later spread in from neighboring orchards or trees.

**Shipments Not Accompanied by Certificate.**—If stock is sent to any person in this State which does not have a certificate attached, *it is in violation of law*, and the purchaser should at once notify the Entomologist at Raleigh, and tell him the name and address of the nursery from which the shipment was received. But before you take this step *be sure* that there is no certificate. It is usually plainly attached on the outside of the package, bundle or box, and is a card or shipping tag bearing the wording of the certificate. If there is no certificate, the trees should be simply bedded in, and *not set out* until the Entomologist is heard from. Uncertified stock is more likely to be infested than certified stock. Sometimes, a duly certified nursery fails to attach the certificate through oversight, but if the trees are from a nursery which does not have a certificate and which is carrying on an illegal business, then the trees should not be planted in any case, as they are very likely to be infested, or there may be something doubtful or dishonorable in the dealings of the concern. We think this should make it clear that *it is the duty of every purchaser to see that no uncertified stock is sent him.*

**See That the Certificate is Valid.**—Every certificate bears a statement showing at what time it becomes invalid or useless. *See that the certificate on your stock is good at the time the stock is delivered to you.*

**Demand That Stock be Fumigated.**—All the nurseries in this State are required by law to fumigate all stock of certain kinds that they send out. The fumigation is done with a very poisonous gas (hydrocyanic acid gas) and is required on all stock of apple, apricot, cherry, peach, pear, plum, and quince, as they are the kinds most likely to be infested with San José Scale. This is required of all nurseries in the State, whether or not the scale has ever been found in them. Some States besides North Caro-

lina have a similar law, but some others do not. When pure chemicals are used, and the box or room used is air-tight, the fumigation is *very effective* against scale, it being only in exceptional cases that any will escape destruction. *It is the part of wisdom, therefore, for every purchaser to require of the nursery a positive guarantee that his stock will be fumigated with hydrocyanic acid gas—he should secure this promise before he gives his order, and it goes almost without saying that he should deal only with a nurseryman on whose word he can depend.*

**Don't Buy Because Stock is Cheap.**—We do *not* say that you should refuse trees because they are cheap; we simply say that they should not be bought merely because they are cheap. There are some nurserymen who only grow a limited number of trees, or who do not make it a regular business, or who grow in wholesale quantities, who may have most excellent stock at low prices. Remember that we are not advising against these. It is not the cheapness of price in itself which we warn you against, but it is the poor quality of trees that you are likely to get when they are offered at such cheap prices. If you are going to neglect the trees—do not intend to cultivate, fertilize, prune or spray them—then a poor tree is about as good as a first-class one, for you simply take your chances in either case. But if you want good, thrifty, well-shaped, profitable trees, you must expect to pay the price, and you cannot afford to order trees from the man offering the lowest prices simply on account of the cheapness. If you *know* that they are first-class trees, then cheapness is not objectionable, but it is cheaper in the end to pay a high price for a first-class tree than to receive diseased trees as a gift. But do not fail to give the trees good attention after they are set. Cultivate, fertilize, prune, and spray them. If this is done intelligently, and good trees are planted in the first place, good results should be secured. *Remember, therefore, that it is better to order where you feel sure of getting good stock, even at high prices, than to buy cheap trees at the risk of getting poor stock.*

**Buy Young Trees.**—There is a growing tendency among fruit growers to buy young stock, only one year from the bud or graft. This allows the grower to shape the tree as he pleases by cutting back or pruning. This plan is safer, also, so far as San José Scale is concerned, because the older the stock becomes in the nursery, the more liable to be infested with San José Scale. Hence you run less risk if you buy young trees.

**Varieties, etc.**—We make no attempt here to discuss the matter of varieties, nor how to set out trees, prune them, etc. Such information can be had by corresponding with the Horticulturist of this Department. Our aim in these suggestions is merely to enable you to get healthy trees which will not be so likely to be infested with serious pests at the time they are planted.

**Fraudulent Claims.**—Nor can we here discuss in detail the many fraudulent claims that have been made from time to time by unreliable persons. Bush strawberries, frost-proof peaches, seedless grapes, coreless apples, quack tree medicines to prevent blight, yellows, and scale, all these are heard of from time to time, and you had better leave them all alone, unless advised by some one whom you know and can depend upon, or by some one whose definite business it is to know and to advise you.

## LIST OF LARGER FRUIT GROWERS OF NORTH CAROLINA.

Listed according to counties in which the orchards are located. All have 500 or more trees of one kind.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Alamance.....	Glenn, D. D.....	Burlington, R. 8.....			1,000	
	Harden, T. R.....	Burlington, R. 7.....	500			
	Kernodle, F. A.....	Elon College, R. 1.....		500		
Alexander.....	Barnett, W. R.....	Taylorsville, R.....	800			
	Bentley, A. D.....	Taylorsville, R. 3.....	900			
	Bumgarner, W. J.....	Taylorsville, R. 5.....	700			
	Childers, John W.....	Taylorsville, R. 3.....	700			
	Childers, J. Marion.....	Taylorsville, R. 3.....	3,000			
	Clanton, J. F.....	Taylorsville, R.....	1,050			
	Daniels, W. M.....	Taylorsville, R. 3.....	600			
	Davis, M. C.....	Taylorsville, R. 5.....	700			
	Davis, O. F.....	Taylorsville, R. 5.....	900			
	Deal, M. K.....	Poors Knob, R. 2.....	500			
	Earp, E. G.....	Taylorsville.....	725			
	Fortner, John G.....	Poors Knob, R. 2.....	1,500			
	Gray, Dr. W. R.....	Davidson College.....	900			
	Hedrick, E. L.....	Taylorsville.....	700			
	Howard, Jesse M.....	Concord.....	500			
	James, W. A.....	Poors Knob, R. 2.....	1,000			
	Kerley, Mrs. Charles.....	Charlotte.....	2,000			
	Kerley, R. C.....	Taylorsville, R. 3.....	575			
	Kincaid Bros. & Thomas.....	Statesville.....	1,000			
	Lowe, B. P.....	Poors Knob, R. 2.....	500			
Ashe.....	Lowe, J. J.....	Poors Knob, R. 2.....	800			
	Lowe, R. B.....	Taylorsville.....	1,500			
	Matheson, Charles P.....	Taylorsville.....	500			
	Meadows, G. C.....	Taylorsville, R. 3.....	500			
	Moore, L. L.....	Taylorsville.....	1,000			
	Rowland, W. T.....	Taylorsville.....	2,000			
	Zickler, Dr. C. B.....	Taylorsville, R. 3.....	1,125			
	Cox, J. F.....	Furches.....	600			
	Worth, W. H.....	Jefferson.....	700			
Avery.....	Andrews, J. G.....	Banners Elk.....	700			
	Biddle, A. B.....	Johnson City, Tenn.....	500			
	Childs, A. D.....	Ingalls.....	1,200			
	Gaunt, J. M.....	Partners. Johnson City, Tenn.....	2,300			
	Martin, R. W.....					
	Howe, F. P.....	Johnson City, Tenn.....	5,000			
	Ingram, J. S.....	Ingalls.....	800			
	Keffer, Prof. Charles A.....	Knoxville, Tenn.....	700			
	Newman, T. W.....	Elk Park.....	1,000			
	Palmer, W. C.....	Elk Park.....	550			
	Phillips, J. G.....	Ingalls.....	1,000			
	Robbins, E. C.....	Saginaw.....	500			
	Wofford, George T.....	Johnson City, Tenn.....	2,000			
	Young, Ralph.....	Minneapolis, N. C.....	2,000			
Beaufort.....	Bailey, W. T., Jr.....	Washington.....	650	5,000		
	Latham, F. P.....	Belhaven, R. 1.....		750		
Bladen.....	Layton, N. A.....	White Oak, R. 1.....			500	
Buncombe.....	Alexander, W. R.....	Swannanoa.....	500			
	Atkinson, W.....	Asheville.....	2,000	1,000		
	Blackstock, H. C.....	Homerville.....	500			

## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Buncombe—con....	Clark, M. O.....	Gem.....	600			
	Coggins, H. A.....	Swannanoa.....	2,300			
	Coleman, J. S.....	Weaverville.....	500			
	Garrett, E. S.....	Cleelum.....	500			
	Gaston, T. P.....	Candler, R. 2.....	600			
	Giles, L. R.....	Cleelum.....	1,000			
	Gragg, John W.....	Bee Tree.....	600			
	Greenwood, John M.....	Barnardsville.....	500			
	Harwood, J. A.....	Barnardsville.....	2,000			
	Jamison, D. B.....	Candler, R. 3.....	800	500		
	Luther, S. J.....	Candler, R. 4.....	650			
	Many, James R. & W. D.....	Black Mountain.....	600			
	Merrick, Charles T.....	Arden.....	1,800			
	Morris & Sheppard.....	Alexander.....	1,200			
	Patton, J. S.....	Canton, R. 3.....	1,400	1,000		
	Penland, W. A.....	Weaverville, R. F. D.....	800			
	Powell, W. V.....	Asheville.....	2,000			
	Reagan, J. J.....	Weaverville.....	500			
	Reeves, W. H.....	Weaverville.....	550			
	Reynolds, Dr. C. V.....	Asheville.....	1,000			
	Scott, J. M.....	Gem.....	600			
	Scott, Mont.....	Gem.....	1,085			
	Stevens, A. E.....	Black Mountain.....	600			
	Tucker, J. H.....	Asheville.....	2,500			
	Walker, J. A.....	Black Mountain, R. 1.....	1,200			
	Weaney, E. D.....	Weaverville.....	500			
	Weaver, T. H.....	Weaverville.....	1,000			
	Webb, Charles A.....	Asheville.....	2,500			
	Whitaker, G. W.....	Dillingham.....	700			
	Whitted, J. A.....	Asheville.....	1,200			
	Williams, N. T.....	Farm School, Asheville.....	1,000			
	Wilson, J. M.....	Fairview.....	850			
	Wilson, Rev. W. S.....	Mooresville.....	700	600		
Burke.....	Asbury, S. M.....	Morganton, R. 2.....	500			
	Clark, N. P.....	Morganton, R. 1.....	2,000			
	Crawley, W. A.....	Morganton, R. 1.....	800			
	Hudson, E. J. & D. P.....	Connelly Springs.....	700			
Cabarrus.....	State Hospital.....	Morganton.....	1,000			
	Blackwelder, N. A.....	Concord, R. 4.....		500		
Caldwell.....	Coffey, Thomas A.....	Blowing Rock.....	1,000			
	Dula, J. A.....	Lenoir.....	2,000	600		
	Green, J. S.....	Blowing Rock.....	500			
	Hatley, J. S.....	Hudson, R. 1.....	500			
	Hawkins, I. M.....	Hudson, R. 1.....	500			
	Ingle, Rev. John.....	Blowing Rock.....	1,100			
	Swanson, S. N.....	Lenoir, R. 3.....	600			
	Ives, George N., & Son.....	New Bern.....		800	800	
Catawba.....	Johnston, M. H.....	Hickory, R. 5.....		1,000		
	Killian, S. E.....	Hickory.....	1,000			
	Miller, A. A.....	Hickory.....	675			
	Shuford, A. C.....	Newton, R. 1.....		1,500	800	
Cherokee.....	Stewart, H. S.....	Andrews.....	1,000			
Cleveland.....	Mauney, W. A.....	Kings Mountain.....		700		
	Osborne, J. C.....	Lawndale.....			600	
	Wiggins, A. G.....	Lattimore, R. 1.....		600		
Columbus.....	Bailey, Elroy.....	Chadbourn.....		800		
Craven.....	Perry, O. H.....	New Bern.....	700	700		
Cumberland.....	Breece, John S.....	Fayetteville.....				700
	Kivett, H. J.....	Fayetteville, R. 6.....		1,000		

## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Davie	Young, T. M.	Mocksville		800		
Duplin	Wells, E. D.	Teachey's		1,000		
	Wells, J. J.	Teachey's		1,000		
	Wells, Levi S.	Teachey's		1,000		
Durham	Flintom, G. W.	Durham, R. 2		1,500		
	Hollowell, Dr. R. L.	West Durham	1,000	500		
	Hornaday, J. M.	Durham		900		
	Horton, W. A.	Durham, R. 2		800		
	Jones, H. L.	Durham	500	700		
	Latta, John N. W.	Durham, R. 2		850		
	Lyon, Buck	Durham		1,500		
	Parrish, E. J.	Durham, R. 3	500	700		
Edgecombe	Hussey, E. B.	Tarboro		4,500		
	Jenkins, T. P.	Tarboro, R. 1		1,000		
Franklin	McGhee, W. L.	Franklinton	500	500		
Gaston	Farmer, John	Bessemer City, R. 1		500		
	Pegram, E. L.	Stanley	500			
	Rhyne, R. M., & Bro.	Mount Holly, R. 1	500			
	Slain, J. M.	Belmont			2,000	
	South'n Benedictine Soc.	Belmont	500			
Granville	Broughton, R.	Oxford	650			
	Horner, Prof. J. C.	Oxford	2,000	500		
Guilford	Anthony, Mrs. G. L.	Greensboro, R. 1			800	
	Boulton, Charles	Jamestown	500			
	Causey, J. C.	Liberty, R. 2		700		
	Glass, G. M.	Greensboro, R. 6	500	500		
	Hughes, J. R.	Greensboro	600	5,000		
	Hunter, Henry	Greensboro, Box 81	750	1,000		
	Idol, W. H.	High Point, R.		2,000		
	Idol, Emerson	High Point		500		
	Smith, J. Ed.	Greensboro, R. 3	1,000	1,000		
	Watson, C. S.	Greensboro			600	
Halifax	Shields' Commissary	Scotland Neck		1,000		
Harnett	Lucas, J. N.	Dunn, R. 3			500	
	Withers, J. A.	Broadway, R. 2	500	500		
Haywood	Allen, John H.	Waynesville, R. 1	2,000			
	Allen, Dr. R. L.	Waynesville	1,000			
	Allen, W. L.	Balsam	600			
	Allison, H. M.	Waynesville	500			
	Barber, R. N.	Waynesville	8,000	9,000		
	Best, Pink	Clyde, R. 1	500			
	Boone, J. K.	Waynesville	2,500			
	Boone, W. K.	Waynesville	1,500			
	Brendle, J. H. N.	Waynesville, R. 1	2,500			
	Cagle, D. M.	Clyde	2,000			
	Caldwell, W. H.	Nellie	500			
	Campbell, R. G. A.	Maggie	600			
	Cogburn, F. H.	Cruso	800			
	Cogburn, J. W.	Cruso	700			
	Davis, T. J.	Clyde	700			
	Davis, Z. C.	Waynesville, R. 2	700			
	Ferguson, N. N.	Waynesville, R. 1	1,400			
	Ferguson, R. M.	Crabtree, R. 1	600			
	Gilmer, R. D.	Waynesville	800			
	Grant, J. D.	Slidel, La.	800			
	Graves, J. O.	Waynesville	3,000			
	Hanes, L. F.	Greensboro	1,900			
	Hannah, Mack W.	Ola	700			
	Haywood Orchard Co.	Waynesville	5,000			

## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Haywood—con.	Howell, E. J.	Waynesville, R. 2.	500			
	Howell, John	Cove Creek	800			
	Howell, J. K.	Cove Creek	1,000			
	Hunt Bros.	Waynesville, R. 3.	1,000			
	Hyatt, I. M.	Waynesville	750			
	Hyatt, J. D.	Waynesville	500			
	Hyatt, T. M. & R. A. L.	Waynesville, R. 1.	4,000			
	Johnston, R. P.	Asheville	4,000			
	Justice, J.	Clyde	1,000			
	Ketner, C. D.	Plott	1,500			
	McClure, James P.	Waynesville	500			
	McClure, W. H.	Waynesville, R. 1.	700			
	McClure, W. J.	Waynesville	700			
	McCracken, A. T.	Waynesville	600			
	McCracken, J. M.	Clyde	1,000			
	Mease, E. E.	Cruso	500			
	Medford, C. V.	Waynesville, R. 1.	1,000			
	Medford, Sewell	Waynesville	800			
	Messer, W. G. B.	Ola	3,000			
	Mussell, A. J.	Waynesville	2,700			
	Noland, D. R.	Crabtree	3,000			
	Norman, N. N.	Waynesville, R. 1.	600			
	Palmer, G. H.	Nellie	1,000			
	Palmer, G. N.	Nellie	700			
	Palmer, J. M.	Waynesville	500			
	Palmer, L. G.	Cataloochee	500			
	Penland, D. M.	Waynesville, R. 3.	750			
	Pless, D. H.	Cruso	500			
	Pless, J. H.	Cruso	700			
	Queen, J. L.	Waynesville, R. 2.	1,500	600		
	Rice, John S.	Waynesville, R. 2.	800			
	Richland Val'y Orch. Co.	Waynesville	3,000			
	Scott, H. P.	Canton, R. 1.	550			
	Scott, H. R.	Canton, R. 1.	600			
	Setzer, J. S.	Maggie	900			
	Setzer, J. V.	Maggie	800			
	Silver, W. H.	Crabtree, R. 1.	500			
	Singleton, J. A.	Waynesville, R. 2.	600			
	Sloan, B. J.	Waynesville, R. 1.	1,200			
	Smathers, D. T. L.	Clyde	1,000			
	Swift, J. P.	Waynesville	500			
	Trull, James A.	Waynesville, R. 3.	600			
	Welch, J. L.	Waynesville	5,500			
	Welch, Julius	Waynesville	2,000			
	Wharton, George	Cruso	7,000			
	Woody, S. L.	Nellie	500			
Henderson	Bane, J. D.	Zirconia, R. 1.	1,000			
	Barber, E. W.	Saluda	1,100	500		
	Brown, Dr. J. Steven	Hendersonville	2,000			
	Brown, R. J.	Hendersonville, R. 2.	5,000			
	Case, Jonathan	Dana	2,000			
	Freeman, W. S.	Bat Cave	850			
	Guerrard, Dr. A. R.	Flat Rock	600			
	Huntley, J. F.	Bear-wallow	900			
	Johnson, T. L.	Fletcher, R. 1.	550			
	Laughter, L.	Ottanola	500			
	Lyda, Andrew M.	Edneyville, R. 1.	800			
	Lyda, J. Manly	Edneyville, R. 1.	6,000			
	Lyda, John S.	Edneyville, R. 1.	500			
	Marshall, B. W.	Hendersonville, R. 1.	600			



## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Henderson—con....	Merrell, James H. ....	Ottanola. ....	800			
	Merrell, John A. ....	Ottanola. ....	600			
	Merrill, P. O. ....	Fairview. ....	1,000			
	Merrill, P. O. ....	Bat Cave. ....	850			
	Moore, Prof. G. B. ....	University of S. C., Columbia, S. C. ....	3,000			
	Morris, B. O. ....	Mocksville. ....	1,100			
	Osteen, E. L. ....	Hendersonville. ....	500			
	Pace, J. M. ....	Saluda, R. 1. ....	500			
	Prior, William. ....	Bear-wallow. ....	1,200			
	Toms, C. F. & M. C. ....	Hendersonville. ....	5,000	2,000		
	Sayer, J. D. ....	Leavitt. ....		3,000		
	Mann, J. S. ....	Middletown. ....			1,200	
Hoke. ....	Barium Spgs. Orphanage	Barium Springs. ....	800			
Hyde. ....	Branch, E. L. ....	Statesville, R. 6. ....	500			
	Cathey, Albert M. ....	Davidson, R. 25. ....			500	
	Jennings, J. T. ....	Jennings. ....	500			
	Myers, L. C. ....	Jennings. ....	1,050			
	State Test Farm. ....	Statesville. ....			500	
	Bryson, T. C. ....	Sylva. ....	1,500			
	Buchanan, J. W. ....	Dillsboro. ....	700			
	Buchanan, W. O. ....	Sylva. ....	700			
	Clayton, W. A. ....	Addie. ....	1,035			
	Cogdill, J. D. ....	Willets. ....	700			
Jackson. ....	Dills, A. B. ....	Sylva. ....	900			
	Fisher, R. M. ....	Barkers Creek. ....	500			
	Haight, A. H. ....	Balsam. ....	700	500		
	Hensau, W. A. ....	Beta. ....	600			
	Jarrett, Robert F. ....	Dillsboro. ....	2,000			
	Jones, T. C. ....	Barkers Creek. ....	1,500			
	Love, J. R. ....	Addie. ....	1,000			
	Miller, George P. ....	Sylva. ....	4,300			
	Rickards, T. M. ....	Balsam. ....	600			
	Atkins, A. C. ....	Sanford. ....		1,000		
	Giles, W. W. ....	Swann. ....		1,200		
	Grainger, H. H. ....	Kinston. ....		3,500		
Lenoir. ....	Herring, N. W. ....	LaGrange. ....			500	
	Pittman, R. E. ....	Gritton. ....		500		
Lincoln. ....	Killian, Jacob F. ....	Denver. ....		2,800		
McDowell. ....	Clark, William. ....	Marion, R. 1. ....		600		
	Holston Corporation. ....	Johnson City, Tenn. ....	1,200			
	Powell, Dr. ....	Asheville. ....	1,000			
	Silver, James M. ....	Old Fort. ....	1,000			
	Swofford, G. L. ....	Ashford. ....	1,000			
	Westerman, H. A. ....	Old Fort. ....	2,500			
	Wilson, J. D. ....	Craig. ....	1,000			
	Bascom, H. M. ....	Highlands. ....	1,500			
	Buchanan, John T. ....	Ellijay. ....	600			
	Edwards & Son. ....	Franklin, R. 3. ....	1,200			
Macon. ....	Fox, T. L. ....	Ellijay. ....	500			
	Harbison, T. G. ....	Highlands. ....	1,200			
	Hardie & Harbison. ....	Highlands. ....	2,000			
	Harrison, J. O. ....	Franklin, R. 1. ....	800			
	Henry, Jacob W. ....	Ellijay. ....	900			
	Henry, John T. ....	Ellijay. ....		500		
	Kinsland, J. L. ....	Franklin. ....	1,100			
	Leatherman, Z. M. ....	West Mills. ....	700			
	Love, D. W. ....	Franklin, R. 1. ....	700			
	McCoy, William. ....	Gneiss. ....	500			

## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Macon—con.	Mincey, C. G.	Ellijay	4,000	1,500		
	Moore, Alex.	Ellijay	800			
	Moore, J. C.	Ellijay	600			
	Moore, J. P.	Ellijay	1,000			
	Peck, I. T.	Gneiss	2,000			
	Rogers, D. G.	Ellijay	1,000	800		
	Rogers, D. J.	Ellijay	500			
	Rogers, T. N.	Alonzo	700			
	Sherwood, W. T.	Highlands	1,400			
	Slagle, A. B.	Franklin, R. 1.	1,000			
	Slagle, A. S.	Franklin	500			
	White, G. P.	Scaly	1,200			
Madison	Buckner, S. E.	Buckner	1,050			
	Burnett, J. P.	English	600			
	English, W. M.	Foust	1,000			
	Ingle, J. H.	Waverly	600			
	Sams, J. R.	Mars Hill	1,100			
	Trollinger, C. B.	Hot Springs		800		
Martin	Watts, J. W.	Williamston	500	1,000		
Mecklenburg.	Alexander, N. S.	Charlotte, R. 9		1,200		
	Caldwell, C. H.	Charlotte, R. 9		700		
	Cathey, Albert M.	Davidson			500	
	Chatham, Paul	Charlotte		2,000		
Mitchell	Frazier, R. M.	Charlotte, R. 5	700			
	McDonald, R. E.	Charlotte		800		
	Black, Samuel	Bakersville	2,000			
	Buchanan, M. L.	Bakersville	500			
	Burleson, M. E.	Glen Ayre	1,650			
	Burleson, Mrs. T. J.	Hawk	800			
	Burleson, W. C.	Hawk	800			
	Green, G. W.	Glen Ayre	500			
	Hughes, H. R.	Little Rock Creek	500			
	Lawrence, H. F.	Spruce Pine	3,000			
	McKinney, Miss Dovie	Bakersville	500			
	Slake, W. M.	Hawk	800			
Montgomery	Wilson, M. L.	Bakersville	1,050			
	Candor Fruit Co.	Candor		30,000		
	Carolina Fruit Co.	Candor		16,000		
	McCallum, Ed.	Candor		500		
	Tomlinson, J. G.	Troy		1,600		
	Wooley, W. F.	Troy		500		
Moore	Abraham, George C.	Southern Pines		3,000		
	Bilyeu, H. P.	Southern Pines				500
	Bradley, C. C.	Southern Pines		2,400		
	Buchan, J. B.	Manly		800		
	Campbell, D. J.	Aberdeen		4,000		
	Foley, M.	Aberdeen		700		
	Lindley, J. Van, Orch. Co.	Southern Pines	1,000	60,000		2,000
	Niagara Fruit Co.	Southern Pines		8,500		
	Parker, W. L.	Niagara		1,200		
	Richards, Joseph F.	Southern Pines		800		
	Smith, Noah	Jackson Springs, R. 1.		700		
	Tilghman, J. H.	Southern Pines		2,000		
Nash	Williamson, I. W.	Carthage	800	700		
	Robbins, H. C.	Sharpsburg	800			
	Williams, M. T.	Rocky Mount, R. 1.	1,500			
New Hanover	Gorman, John	Wilmington	500	1,500		
	Taylor, Ed.	Wilmington		900		
Orange	Hobbs, John R.	Efland, R. 2.	500			

## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Orange—con.	White, C. C.	Durham, R. 5	500			
	Williams, H. H.	Chapel Hill	2,000	800		
Pender	Corbett, W. M., Jr.	Olga		3,000		
Polk	Barber, E. W.	Saluda	1,100			
	Burgess, N. C.	Dennis	800			
	Bushnell, J. C.	Saluda	1,200			
	Chisholm, W. D.	Saluda	500			
	Lindsey, W. T.	Tryon		800		
	McCrain, Edgar	Walker	500			
	McCraw, J. A.	Dana, R. 1	600			
	McMurray, A. G.	Dennis	1,000	600		
	Newman, Logan	Fishtop	500			
	Pace, Thomas E.	Fishtop		500		
	Thompson, D. H.	Walker	600			
	Thompson, William	Walker	1,000			
	Williams, P. D.	Millspring, R. 1	500		500	
Randolph	Field, J. M.	Climax	1,350			
	Hammer, William C.	Ashboro	1,000	2,800		
	Hobbs, C. H.	Newmarket			1,500	
Richmond	Spivey, A. D.	Ellerbe		500		
Robeson	McDonald, W. J.	Wakulla		800		
Rockingham	Cunningham, C. D.	Benaja, R. 1	1,000			
	Ostrand, J. Van	Stoneville	1,600		600	
	Pratt, Thomas R.	Madison	1,000			
	Price, James S.	Madison, R. 1	1,500	500	500	
	Ware, S. H.	Reidsville	600			
Rowan	Hall, W. A.	Salisbury, R. 5		500		
	Williams, W. W.	Salisbury, R. 1			1,200	
Rutherford	Bridges, A. M.	Ellenboro		500		
	Flack, J. M.	Bat Cave	500			
	Frady, D. F.	Uree	1,000	500		
	Freeman, J. B.	Bat Cave	4,000	5,000		
	Harrill, W. H.	Bostie, R. 3			500	
	Haynes, Berry	Uree		500		
	Henderson, Mrs. Dora	Chimney Rock	800			
	Martin, P. D.	Bostie, R. 2	1,000	500		
Sampson	Britt, J. H.	Keener, R. 1	2,100	500		
	Hobbs, T. A.	Keener, R. 1	6,000			
	Weeks, J. A.	Keener	700			
Stanly	Harward, W. A.	Bridgeport	500			
Stokes	Ashburn, J. A.	Partners. Winston		2,000		
	Norman, Jas.					
	Martin, W. M.	Westfield, R. 1		800		
Surry	Banner Orchard Co.	Mount Airy, R. 6	2,000			
	Blue, John	White Plains		600		
	Bray, James	Elkin	850			
	Brim, T. L.	Brim	1,000			
	Brim, W. M.	Brim	500			
	Brown, E. L.	Mount Airy	600	1,300		
	Collins, Alex.	Mount Airy	750			
	Combs, E. S.	Roaring Gap, R. 1	500			
	Combs, N. P.	Roaring Gap, R. 7	500			
	Cratie, Thomas	Round Peak	540			
	Critz, R. D.	Mount Airy, R. 3	700			
	Dison, Robert	Mount Airy, R. 5	500			
	Dix, J. M.	Mount Airy	750			
	Gardner, John W.	Mount Airy, R. 3	500			
	Granite City Orch. Co.	Mount Airy	3,000	1,000		
	Jones, A. S.	Mount Airy, R. 4	500			

## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Surry—con.	Jones, T. A.	Mount Airy, R. 3.	800			
	Lewis, S. T.	Brim, R. 1.	1,200			
	McCargo & Smith.	Mount Airy	800			
	Merritt, W. E.	Mount Airy	1,200			
	Miller, J. F.	Elkin, R. 1.	500			
	Moore, M. D.	Mount Airy	1,800			
	Mount Airy Orchard Co.	Ladonia	7,500	500		
	Reeves, J. T.	Mount Airy, R. 1.	500			
	Scott, P. G.	Shoals	500			
	Smith, J. M.	State Road.		800		
	Sparger Orchard Co.	Mount Airy	13,000	5,000		
	Wolfe, William H.	Roaring Gap, R. 1.	1,000			
	Wolff, W. Harrison.	Union Hill	500			
	Woodruff, T. N.	Low Gap.		500		
Swain.	York, W. J.	Mount Airy, R. 4.	500			
	Black, S. W.	Bryson City	500			
	Bryson, T. D.	Bryson City	1,750			
	Childers, A. P.	Bryson City	800			
	Fry, A. M.	Bryson City	2,000			
	Jones, T. C.	Whittier, R. 2	800			
Vance.	Randall, C. E.	Bryson City, R. 1	500			
	Continental Plant Co.	Kittrell.		6,000		
Warren.	Agelasto, P. A.	Norfolk, Va.	800			
Watauga.	Austin, W. L.	Blowing Rock	600			
	Brown, J. D.	Blowing Rock	4,000			
	Cone, Mrs. Moses H.	Blowing Rock	27,000			
	Dobbin, H. A.	Valle Crucis	1,800			
	Downs, C. W.	Blowing Rock	700			
	Green, R. W.	Summit, R. 1.	800			
	Killian, S. E.	Hickory	1,000			
	Lentz, W. C.	Blowing Rock	1,000			
	Lewis, J. S.	Vilas	500			
	Phillips, H. C.	Sweetwater	800			
	Teague, H. J.	Blowing Rock	500			
	Underdown, E. G.	Blowing Rock		500		
	Valle Crucis Orchard	Valle Crucis	5,000			
	Wilson, A. J.	Zionville, R. 1	1,500			
	Wilson, J. A. J.	Zionville, R. 1	500			
Wayne.	Granger, W. P.	Goldsboro	1,000			
Wilkes.	Ashley, J. H.	Poors Knob, R. 1.	500			
	Baity, I. S.	Gilreath	600			
	Barnett, W. H.	Poors Knob, R. 1.	750			
	Bentley, W. A.	Roaring River	1,300			
	Beny, W. W.	Wilkesboro, R. 2.	700			
	Bobbitt, A. J.	Gilreath	600			
	Bourne, David.	Boomer	5,500			
	Brayhill, W. A.	Poors Knob, R. 2.	700			
	Call, Clarence.	North Wilkesboro	2,000	500		
	Combs, N. F.	Roaring Gap.	1,120			
	Davis, J. W.	Poors Knob, R. 1.	1,500			
	Duncan, C. D.	Moravian Falls.	1,200			
	Edsill, R. M.	Moravian Falls.	1,000			
	Finley, T. B.	Wilkesboro.	600			
	Fletcher, H. F.	Poors Knob, R. 1.	3,000	1,000		
	Fletcher, J. W.	Straw	2,000			
	Fortner, J. G.	Poors Knob, R. 2.	1,400			
	Fox, T. W.	Boomer	900			
	Frazier, W. R.	Moravian Falls.	500			
	Gold Medal Orchard	Oakwoods	3,000	525		

## LIST OF FRUIT GROWERS—CONTINUED.

County.	Name.	Address.	Apple.	Peach.	Pear.	Plum.
Wilkes—con.	Harris, R. W.	Roaring Gap.	550			
	Hendren, J. J.	Poors Knob.	800			
	Horton, H. W.	North Wilkesboro.	1,000			
	Jennings, J. S.	Poors Knob, R.	1,000			
	Lowe, C. A.	Poors Knob, R.	600			
	Lowe, E. F.	Poors Knob, R. 2.	1,300			
	Lowe, J. F.	Poors Knob, R. 1.	600			
	Lowe, W. P.	Poors Knob, R. 1.	600			
	McGhinnis, Vance.	Boomer, R. 1.	1,000			
	Morlow, J. M.	Gilreath.	500			
	Peden, J. T.	Wilkesboro.	500			
	Reece, D. A.	Poors Knob, R. 1.	500			
	Roberson, J. J.	Poors Knob, R. 1.	500			
	Robinson, C. W.	Poors Knob, R. 1.	1,100			
	Rock, William D.	Charlotte, Box 87.	1,800			
	Ronda, Pearson	Poors Knob.	600			
	Rountree, D.	Poors Knob.	750			
	Russell, Jefferson.	Poors Knob, R. 2.	10,000			
	Smoot, C. C., & Co.	North Wilkesboro.	2,500			
	Steelman, D.	Oakwoods.	600			
	Sydnor, W. A.	Wilkesboro.	2,200	1,000		
	Townsend, M. L.	Gilreath.	4,000			
	Triangle Orchard Co.	Poors Knob.	500			
	Triplett, C. R.	Hunting Creek.	500			
	Vannoy, A. M.	Poors Knob.	4,500			
	Wike, D. R.	Poors Knob, R. 1.	750			
Wilson.	Jenkins, J. T.	} Partners. Wilson.		2,400		
	Privett, A. H.					
Yadkin.	Casstevens, M. A.	Booneville, R. 1.			550	
	Garner, S. W.	Yadkinville, R. 1.		1,500		
Yancey.	Bailey, J. E.	Bald Creek.	500			
	Banks, W. B.	Burnsville.	500			
	Burton, W. W.	Bald Creek.	1,000			
	Byrd, S. G.	Swiss.	1,500			
	Ewing, Dr. J. B.	Boonford.	600			
	Gibbs, A. L.	Bald Creek.	600			
	Hensley, J. T.	Swiss.	700			
	Hensley, W. H.	Bald Creek.	600			
	Higgins, J. W.	Wampler.	500			
	McCracken, R. H.	Flinty.	1,600			
	McPeters, C. L.	Bald Creek.	800			
	Penland, J. R.	Burnsville.	3,000			
	Penland, J. R.	Pensacola.	1,500			
	Proffit, H. A.	Bald Creek.	800			
	Ray, J. B.	Bald Creek.	500			
	Ray, R. F.	Bald Creek.	600			
	Wray, W. B.	Cane River.	700			

### LEAF TOBACCO SALES FOR APRIL, 1915.

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Pounds sold for producers, first hand	510,351
Pounds sold for dealers	52,963
Pounds sold for warehouses	35,593
Total	598,907

**THE BULLETIN**

OF THE

**NORTH CAROLINA**

**DEPARTMENT OF AGRICULTURE**

**RALEIGH**

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**Vol. 36, No. 7.**

**JULY, 1915.**

**Whole No. 219.**

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**Part 1. AGRICULTURAL ACHIEVEMENTS AND PROBLEMS IN  
NORTH CAROLINA.**

A paper read by W. A. Graham, Commissioner, before Southern Commercial Congress, at Muskogee, Oklahoma, April 26, 1915.

**Part 2. NORTH CAROLINA, THE LAND OF OPPORTUNITY.**

An address by Bion H. Butler, before North Carolina Press Association, June 24, 1915.

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of March 6, 1900.

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EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS

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‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.



## AGRICULTURAL ACHIEVEMENTS AND PROBLEMS IN NORTH CAROLINA

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BY W. A. GRAHAM, Commissioner of Agriculture.

Upon the close of the war in 1865, the high price of cotton seems to have greatly influenced the minds of the farmers of the Southern States and induced North Carolina to become largely a Cotton State; the cultivation was resumed on many farms where it had been abandoned and the gin house and cotton press become unfit for use. The farmer was impressed with the idea that he could raise cotton and with the money received from its sale buy everything he needed, both necessities and luxuries, and there was no thought of economy. Cotton was the security required for advance of provisions or indulgence in accounts. It was necessary for the farmer to have advances in order to make his crop; and he was compelled to raise cotton. In this period the mortgage or lien on the crop to be produced that year was introduced as security for advances of goods, especially supplies for the farm. But it was not confined to this class of goods; it was good as security for any kind of goods which the advancer had for sale.

Thus the farmer adopted the one-crop cotton system, more from necessity than from choice. It is true that the price of cotton was higher than it had been in former times, but the price of what the farmer purchased had risen equally. The poet tells "that distance lends enchantment to the view and robes the sky in azure blue"; so the postponement of the day of settlement gave the future a radiant hue to the farmer, and he could but believe that "tomorrow would fulfill the expectations of today."

Leaving the realm of poetry and coming to prose, he was like the negro who on passing a lot of clothing hung out to dry took a shirt. Upon being told he would have that to answer for judgment day replied that if it is as long a credit as that "I'll take two." The farmer saw no need of practicing economy as to his purchases, thinking that prices would remain high and he would be able to settle for anything that he wished.

It is remarkable how long the farmer continued this custom, although each year he came out in debt, which he expected to pay by increasing the acreage of his cotton; his credit was valued not by the amount of cotton he produced but by the number of acres he had planted. Corn or other grain, stock or hogs, were not recognized as good security; the merchants preferred to buy these articles, which composed the larger part of his goods, beyond the limits of the State, or perhaps he was unwilling to let the farmers know the enormous profit he was charging on

these supplies—fifty, seventy-five and even one hundred per cent for six or eight months credit.

This custom was almost universal when cotton was the principal crop, and it was generally true that the people were in straitened circumstances. At the same time, in most of the counties there were men who raised corn and meat to sell and who had money to loan, made by this manner of farming. The trouble was that the farmer brought ruin upon himself by endeavoring to raise something to buy corn with instead of raising it upon the farm.

When I became connected with the Department of Agriculture in 1899 the almost universal lack of cash with the farmers made them a dependent and not an independent class of citizens as they formerly were. This caused me to inquire if there was ever a time when the Southern farmer had any money or had this always been his condition. Being old enough to have been farming in 1861 (going from my farm into the Confederate Army in 1861 and returning in 1865) knowledge of the condition of the farmers at that time answered my question: the farmer then was the most independent class of people, and when a man in town needed money he did not go to some other city to borrow but went into the country among the farmers and they had it to lend. Why did the farmer have this cash then and was in such bad financial condition now? The change had been caused by the different financial results in the farming in these days and at that time. Then the farmer raised all the supplies for his farm and generally a surplus of this class of crops; cotton and tobacco were his money crops, and what he received for them was not consumed by debts for supplies. It was net profit. Corn was then as now the foundation for farming. It was recognized as such by epigrams. An independent man was one who had corn to sell; a hat on the side of the head "looked like a man who had corn to sell." A state of happiness and contentment was by the minstrels said to be:

"Corn in the crib, money in the pocket,  
A babe in the cradle, a pretty wife to rock it;  
Meat in the smokehouse, and there I go to find it."

I have in my life attended many sheriffs' sales for debt, but have never seen the sheriff in execution sales offer a full crib of corn; and although I have called attention to this in nearly every Southern State I have not found the man who has seen it. There were forty states represented in the Congress at Muskogee. I called for the men who had ever seen it and no one arose. I claim it as an axiom that *a man with a full crib of corn will not be sold out for debt.*

The boys sang:

"All I want in this creation  
Is a pretty little wife and a big plantation."  
\*       \*       \*       \*       \*       \*

"If ever I get back again I'll lead a different life,  
Save my money, buy a farm, take Dinah for my wife."

The negro sang:

"If I had a scolding wife,  
I'd whip her sure's you born;  
I'd send her down to New Orleans,  
And trade her off for corn."

The ballads which generally express conditions of the people and times then recognized farming as a profitable business, due to the supply of corn.

The institution of the North Carolina Department of Agriculture under power of the Constitution was authorized by the Legislature in 1877. The principal business from that time to 1899 was the analysis of fertilizers, as a very poor quality of goods had appeared in the State, the publication of bulletins, and exhibition of the products of the State at national and interstate expositions.

In 1899 the Department was by law reorganized, to be directed by a Commissioner of Agriculture and a board composed of one member from each Congressional District, with fourteen different departments of work stated. Shortly after this it was enacted that the Commissioner and members of the board should be "practical farmers engaged in their profession." The work of the Department was with the *adult* farmers of the State, those who were too old for school age and most of whom had had but very limited opportunities for education. Neither the orator nor technical book could be used to advantage, but such measures as would cause them to think were required:

"To make men think at all  
Is of all things the principal;  
The second is of importance quite,  
Make them when they think, think right.  
The third, and then your task is through,  
When 'tis done, think that is right which they do."

The good book says that man should eat bread by the sweat of his *face*. Some one said *brow*. Many farmers seem to think that the brow is located on the back and that the amount of sweat produced is the main thing desired—use of the muscle, not of the brain. The brow is on the head and near the brain and would rather indicate work of the brain than of the muscles. Let the farmer learn the location of and use his brow and brain; not be like the Irishman who having volunteered took a piece of metal as a shield to the tailor who was making his uniform and told him to place it over his heart. The tailor put it in the seat of his breeches. In the battle Pat concluded to "fight another day" and turned to flee. A bullet from the enemy struck the metal, whereupon Pat exclaimed: "Faith, and ain't it a great thing to know where a man's heart lies."

To use such means as would enable the adult farmer to locate and use his brain was the object of the Department. The State could not wait until the boys were educated but wished to use the grown-up farmers, while giving the young people every opportunity for preparation

to meet the situation when they should come to maturity. That the Department has made greater advances in its work than any other Southern State is due to the attention that it has given to the development of the adult farmer. He was the State's most valuable undeveloped asset and yielded the quickest and most valuable return.

Institutes and demonstrations have been the most potent means for this work and right nobly have the farmers responded as the results prove.

#### SOME OF THE ACHIEVEMENTS.

The Census of North Carolina reported:

##### 1860

Corn .....	30,078,564 bushels.
Wheat .....	4,078,706 bushels.
Cotton .....	145,000 bales.
Hogs .....	1,246,820

	1900.	1910.
Horses .....	159,153	166,151
Mules .....	135,610	174,711
Sheep .....	303,178	214,473
Cattle .....	624,518	700,861
Dairy Cows .....	233,178	308,914
Hogs .....	1,300,000	1,227,625
Poultry and Eggs	\$2,689,970	\$8,094,954
Cotton .....	443,814 bales.	665,132 bales.

	1900.		1910.	
	Total.	Per Acre.	Total.	Per Acre.
Corn .....	34,818,860 bu.	12.8 bu.	34,063,531 bu.	13.8 bu.
Wheat .....	4,342,351 bu.	5.8 bu.	3,827,145 bu.	7.6 bu.
Oats .....	2,554,768 bu.	18 bu.	2,792,508 bu.	12.2 bu.
Hay .....	369,732 tons.	1.9 tons.	369,332 tons.	.98 tons.
Sweet Potatoes ....	5,781,587 bu.	84 bu.	8,493,283 bu.	100 bu.
Peanuts .....	3,460,439 bu.	.....	5,980,919 bu.	30.6 bu.
Tobacco .....	127,503,404 lbs.	628 lbs.	138,813,163 lbs.	625 lbs.

##### Fruit Trees.

	1900.		1910.	
Apples .....	6,438,871 trees.	4,662,614 bu.	6,345,508 trees.	4,775,693 bu.
Peach .....	2,773,788 trees.	373,663 bu.	2,661,791 trees.	1,344,410 bu.

*Value Farm Products:* In 1900, \$68,624,912; in 1910, \$142,890,192.

The Census of 1910 was an era in agricultural history. The advance in this State has scarcely, if ever, been equaled in agricultural history. It would require too much space to insert the figures for each year so I take 1914, which can be compared with those of 1910:

Hogs .....	1,525,000.		
Corn .....	60,000,000 bushels;	20.3	bushels per acre.
Wheat .....	8,000,000 bushels;	12	bushels per acre.
Oats .....	4,373,000 bushels;	17.5	bushels per acre.
Sweet Potatoes ....	8,000,000 bushels;	100.	bushels per acre.
Hay .....	368,000 tons;	1.15	tons per acre.
Peanuts .....	8,205,000 bushels;	37	bushels per acre.
Tobacco .....	172,250,000 pounds;	650	pounds per acre.
Cotton .....	966,000 bales;	283	pounds per acre.
Apples .....	9,000,000 bushels.		

In 1913 North Carolina stood sixth among the States as to value of crops per acre—\$24.84. Only Connecticut, Massachusetts, Rhode Island, New Jersey and South Carolina exceeding her—South Carolina being thirty-five cents greater. In 1914 she passed South Carolina by three dollars. She excels not only the other Southern States but the States of the corn and grain belts, which are generally denoted the garden spot of the nation, where farming is most remunerative. The Census of 1910, Report on Wealth, Debt and Taxation, reports the average wealth of a citizen of North Carolina in 1912 as \$323.90—thirty-seventh in rank; in 1902 it was \$177.98, nearly eighty per cent increase.

North Carolina for five successive years has led the cotton states in amount per acre, 290 pounds of lint cotton being the amount this year; 315 in 1911, 267 in 1912, 239 in 1913.

The value of the agricultural crops of the State, including animals, in 1913 was estimated at \$241,533,670.

#### PRODUCTION PER INDIVIDUAL.

	<i>Corn.</i>	<i>Wheat.</i>	<i>Tobacco.</i>	<i>Sweet Potatoes.</i>	<i>Cotton.</i>
1860..	30 bushels.	4.7 bushels.	23 pounds.	62 bushels.	1-6 bales.
1910..	15 bushels.	1.8 bushels.	69 pounds.	4 bushels.	1-3 bales.
1914..	24 bushels.	3-4 bushels.	70 pounds.	3.5 bushels.	2-5 bales.

In 1914 the cotton crop was \$35,000,000; imported wheat, oats, corn and hay, \$12,000,000. There was a total importation of \$17,000,000 worth of things that should be produced in the State.

In 1914 225,000 bushels of North Carolina corn was exported from Norfolk. One million dollars worth of cattle and feed was sent to South Carolina besides truck and other things.

In 1910 North Carolina ranked twenty-second in value of crops, the value being \$102,783,000; in 1913 this State ranked thirteenth, the crop value being \$150,203,000.

Wheat required for bread, 10,526,000 bushels; for seed, 715,000 bushels—11,241,000 bushels. In 1915 the crop was 10,900,000 bushels, according to the report of the United States Department.

Tobacco crop, five years average—Kentucky, \$71.71; North Carolina, \$88.71 per acre.

Total value of property in North Carolina in 1912 was \$1,807,573,780.

Corn in 1900..U. S., 25.3 bushels; in N. C., 13.8 bushels per acre.

Corn in 1914..U. S., 25.8 bushels; in N. C., 22.0 bushels per acre.

Wheat in 1914..U. S., 16.6 bushels; in N. C., 12.7 bushels per acre.

Wealth per capita, 1902, \$177.98; in 1912, \$323.90; 80 per cent increase. Thirty-seventh in rank.

The value of the agricultural crops of the State, including animals, in 1913 was estimated at \$241,533,670.

North Carolina is thought to be the only cotton state that does not import each year provisions for men and animals and animals for farm

use which, could be raised in the State, to an amount equal to the money received for its cotton crop.

In 1910 North Carolina imports were \$59,000,000 while the cotton crop was \$54,000,000. The farmers took notice and in 1911 the imports of feeds had declined to \$39,000,000, and in 1914 to \$20,000,000. The fact that our farmers had produced the amount of feed that our report shows caused the North Carolina farmers to be able to weather the storm caused by the decline in price of cotton last year with less inconvenience than those of any other State. There was exported last year \$3,000,000 in feed and cattle.

#### INSTITUTES.

Mr. T. B. Parker is director of this work. In 1903 there were 17 institutes in 16 counties; in 1914 there were 501 institutes in 98 counties; attendance, 35,000 men and 36,000 women. Total, 71,819. The attendance of women is double that of any other State.

Besides the regular tours of institutes, lecturers are furnished when desired to any other assembly on any subject wished to be discussed. An effort is made to form a permanent association at every point where an institute is held.

An institute party consists of speakers from the force of the Department and the A. and M. College, representing at least two of the objects embraced in the Department's work, a woman lecturer and a farmer who has achieved success in his work. The time to discuss the good in *book* farming has passed; those who attend do not need information on this line. The attendance has been gradually increased; in the beginning 20 or less was about the number present. Now a farmers' institute is the most popular assembly in the State and 100 or more usually attend. The addresses are in language which all can understand. The speaker must have something to say, say it and stop. "A never-quit" does the cause much harm and so does the scientific man who must by manner at least express his disgust at the simplicity of the question asked. A man who has nothing to say generally "hollers."

There is usually a prize offered for the best five ears of seed corn, the best loaf of bread (corn meal or flour) or the best cake, for girls and one for women; also some years there is a premium for the boys for the best pig.

The dinner hour is usually the most important of the day. The speakers mingle with the people and those who may be too timid to speak in public have opportunity to seek information along any particular line they may wish or to ask that this subject be discussed in the afternoon. After institutes have been held a few times the number willing to ask questions increases and this is most valuable; the object of the institute is to have the audience take part in the speaking. Whenever questions from the audience relate mostly to the same subject, although some other question may have been slated for the hour, it is thought best to discuss what the people seem to be interested in.

Any locality wishing an institute writes the director and he fixes date and location at the most suitable point. Institutes are not held if not requested, but the larger number does not always prevail. A few interested people in a community can exert an influence and soon have increased numbers, or by their demonstration of the ideas received uplift and advance the agricultural interests of their neighborhood.

### WOMAN'S WORK.

The latter part of the sentiment which was carried on the front of Turner's Almanac fifty years or more ago, viz.,

"A good husbandman without there is needful to be,  
A good housewife within is as needful as he,"

has always deserved much more attention than it received. The farmers' wives and daughters have received but little consideration or remuneration in the management of the farm. They have been stockholders but not directors. The following anecdote represents the case: Five boys having each a penny organized to buy a cigar—probably the first tobacco combine. Jim was elected president and given the funds. He bought the cigar and returned pompously smoking. Tom applied for a smoke, as he was a stockholder. Jim replied, "I'm the president; I smoke; stockholders can spit."

Many farmers who complain of the expenditures of the women of their families are about in the condition of the negro who was complaining about his wife on this line: "Never seed a woman wanting to spend so much money." Being asked how much he had given her he replied, "I ain't never gi'n her none yet."

The object of the Department is to end this state of affairs. You cannot keep the girls on the farm unless you keep the boys there; to do so the life must be made pleasant and profitable, and there is no reason why it should not be so. Lecturers furnish suggestions along all lines of housework—food, health, clothes-making, etc., and especially as to canning, pickling and preserving meats, fruits and vegetables. The head of the women's work is a native of the State, Mrs. McKimmon. She gives directions when desired along these lines and arranges for the sale of the goods, which are warranted to be true to sample as to measure and quality. She operated in thirty counties last year. The girls and their mothers cleared \$26,000 in personal profits or \$800 to the county. This will be largely increased this year and a permanent industry advanced. The Department desires to help produce the time that the birth of a daughter shall not be regarded as the arrival of an undesirable addition to the family, but the farmers' wives and daughters will show that it was not ability but opportunity that they lacked to have remedied matters prior to this time. Instead of having to go to the old man for every dollar they need they will not only pay for what they wish but lend him some money when he is in need, as they did in some places last fall when the slump in the price of cotton wrought such a change in financial

affairs. The greatest advance which the Church has made in its work in the past twenty-five years is largely due to the women actively engaged in its work, and we can have the same advance in agriculture by letting them take part in it.

#### DEMONSTRATION.

This work was formerly connected with that of institutes and agronomy, with coöperation of the county commissioners. Some member of the force would arrange with some farmer on each of the four public roads leading from the courthouse to devote an acre to work under direction of the Department, the Department to furnish the seed and fertilizer and the man to work as directed and report. The intention was to test for the county the results ascertained at the test farms. Several times during the season one of the Department's force visited the farm and also any other farmer desiring him. The object was to prepare men for demonstration work. Seventy-seven counties had been enlisted in it. After the Ogden Association assumed charge of this work and made such liberal allowances for it it was made a separate work and the U. S. Department appointed a director, Mr. C. R. Hudson, and the work became coöperative. When a county will contribute, a demonstrator with the approval of the county commissioners is appointed to superintend the work. The difficulty has been to find men competent, but the State is divided into districts of specified counties and the demonstrators are called to sessions where lectures relating to their duties are given. A short course is given them annually at the A. and M. College.

These demonstrators give attention to all kinds of farm work—soils, crops, animals and economics.

#### BOYS' CORN CLUBS.

Mr. Parker had introduced these in the State before coöperation with the Southern Educational Board was begun. It was turned over to this board and is now under the efficient management of Mr. T. E. Browne, a successful North Carolina farmer. The largest yield reported is by Charlie Parker of Hertford County, 235 1-2 bushels of merchantable corn.

In 1910 the Boys' Corn Club averaged 57.7 bushels per acre.

51 boys made from 75 to 100 bushels per acre.

23 boys made from 100 to 130 bushels per acre.

10 boys made from 130 to 146 bushels per acre.

#### THE ANALYTICAL WORK.

This is under the direction of Prof. B. W. Kilgore, State Chemist. Ten years ago requests were generally for formulas for particular crops, but it was ascertained that the value depended greatly on the composition of the land; that the lands of the eastern counties contained more phosphoric acid than the middle and western; that the nitrogen in the clay counties could be profitably secured from the air through the use of legumes; that the soils in the granite counties carried large amounts



of potash; so that these ingredients could be omitted or lessened when they were available, and by the experiments on the test farms information could be obtained.

The State has seven test farms on different types of soil, the underlying rock generally determining the type of soil. Much information has been obtained in this way. A soil survey is conducted in coöperation with the National Department. There is not much complaint as to guarantee of fertilizers being preserved in the goods.

#### VETERINARY AND ANIMAL INDUSTRY.

##### *Tick Eradication.*

In 1794 the Legislature passed a law forbidding the removal of cattle from the long-leaf pine to the oak section and vice versa, except between April 1st and November 1st each year, as it caused *murrain*. This, of course, was the work of the fever tick. In 1894 Congress passed the first quarantine law which forbade removal of cattle along a specified line across the country and provided for the eradication of the tick. The States coöperated with the National Government. The quarantine line in North Carolina in 1902 was along the crest of the Blue Ridge Mountains. January 1, 1915, the State had been cleared of the fever tick from its western boundary to the Roanoke River, embracing 33,341 square miles of the 48,580 miles contained in the State, leaving 15,000 square miles in quarantine, or twenty-two of the one hundred counties. These are extreme eastern counties and the larger portion of the territory is covered with water.

The eradication work is confined to the *stock law* or no fence counties and will be until all are embraced. It is not considered feasible to work the free range counties as it would be reinfected in the spring each year. The eradication work was greatly advanced by the stock law being adopted in advance in all the Piedmont and many of the eastern counties; few ticks are found where it prevails.

Cattle in counties where the tick has been eradicated sell for from one to one and one-half cents per pound more than in free range. The cattle in the freed territory number 373,013, and their value has been increased \$1,875,665 by exemption from the tick.

##### *Hog Cholera.*

There has been discovered no remedy for hog cholera, only prevention by vaccination. The loss in North Carolina a few years ago was very heavy. The State erected a plant for the manufacture of anti-hog cholera serum, which is sold to the farmers at seventy-five cents per 100 cc., about fifteen cents per minimum dose of 20 cc. Ninety-eight per cent of the hogs vaccinated have escaped cholera. The veterinarian or an assistant visits sections and gives instruction in vaccination. The stock law in many sections of the State has been of great value as a prevention of the spread of hog cholera.

*Dairies.*

The Department has advised against the establishment of creameries before there is arrangement for the supply of milk, so that the State has avoided the loss by premature creameries which other States have suffered. There are now nine creameries in operation. They will be increased as places of profitable returns shall be located. Two cheese factories have been organized.

*Beef Feeding.*

The Department conducts in coöperation with the U. S. Station experiments in feeding beef cattle, and issues bulletins as to the results of different feeds, manner or time of feeding or any other matter relating to this subject. Certain feeds seem to make more meat and better conditioned animals than others, bringing a cent per pound more on the market. The director of animal husbandry gives attention to the rearing and breeding of all kinds of stock suitable to this section. The State purchased ten bulls of improved breeds and placed them among the farmers in the beef section of the State, the farmers who kept the bulls receiving the fees. This added several hundred valuable calves to this section.

Hogs can be raised very cheaply with soja beans, peanuts, burr clover, vetch, etc.

In eastern North Carolina cattle run on the range the entire year without feed or shelter. They are in good condition February 1st, and it is thought that if they were stalled at this time they would be in as good condition as the mountain cattle on November 1st.

## ENTOMOLOGY.

Prof. Franklin Sherman, Entomologist, gives attention to the inspection of all fruit trees brought into the State and to orchards in the State where requested. He conducts a tour of practical institutes with the Horticultural Division in pruning and spraying against injurious plant diseases and insects. A few years ago many peach trees were destroyed in endeavoring to eradicate the San José scale. While this cannot be done, yet Prof. Sherman has by spraying succeeded in so curtailing it that fruit trees have been replanted and successful crops have been produced on the same land. No new disease has obtained a foothold since he has been with the Department.

## HORTICULTURE.

Prof. W. N. Hutt, with the Entomological Division, conducts institutes on pruning, spraying, cultivation and fertilizing of vegetables and fruits. The Chadbourn section is unsurpassed in the nation for strawberries, and large quantities of other truck are raised in eastern North Carolina. The scuppermong grape has its home here. In coöperation

with the National Department experiments have been conducted for several years to produce a bunch variety of this grape, which now generally grows each one to itself. When this is accomplished the cultivation of the grape will be a most profitable industry, as it can then be transported.

The North Carolina apples a few years ago were almost unknown in the markets. They are unsurpassed in quality and by exhibits at the State and national fairs have become generally known in the United States through the work of Prof. Hutt and his assistant, Prof. Shaw.

The following premiums, medals, have been awarded North Carolina apples:

1. At Council Bluffs, Ia., in 1909 at the National Horticultural Congress:

- Best Home Orchard Collection for Eastern United States.
- Best Collection of Pecans in United States.
- Best Collection of Commercially Packed Vegetables in Glass.
- Best Plate of Peanuts from any Section.
- Third for General Display of Fruits in Sweepstakes Class for United States, Canada, and Mexico.
- Best Display of Evaporated Apples.
- Best Display of Mockernuts.
- Best Display of Butternuts.
- Best General Collection of Nuts in United States.
- Best Single Plate of Quinces.
- Best General Collection of Pears Grown in Any State East of the Mississippi River.

2. At Council Bluffs, Ia., in 1910 at the National Horticultural Congress:

- Sweepstakes ON BEST DISPLAY OF FRUITS IN THE UNITED STATES.
- Best Plate Display of Apples from Eastern and Gulf States.
- Sweepstakes on Best Collection of Nuts in United States.
- Best Display of Vegetables from Eastern and Gulf States.
- Best Plate of Peanuts in the United States.
- Best Collection of English Walnuts.
- Best Display of Commercially Canned Corn.
- Best Display of Commercially Canned Tomatoes.
- Best Display of Commercially Canned Asparagus.
- Best Display of Commercially Canned Vegetables.
- Best Display of Commercially Canned Pears.
- Best Display of Commercially Canned Peaches.
- Best Display of Commercially Preserved Fruits.
- Best Display of Commercially Canned Fruits.
- Best Box Oranges.
- Best General Collection of Citrus and Subtropical Fruits.
- Best Plate Mockernuts.
- Best Collection Filberts.
- Best Plate Butternuts.
- Best Plate Walnuts.
- Best Plate Japanese Chestnuts.
- Best Collection Pecans.
- Best Plate of Nuts Grown by Exhibitor.
- Best General Display Japanese Persimmons.
- Best General Display American Persimmons.

3. At St. Joseph, Mo., in 1911 at the National Horticultural Congress:

**SWEEPSTAKES ON BEST AND LARGEST HORTICULTURAL DISPLAY BY ANY STATE.**

Best General Display of Citrus and Subtropical Fruits.

Best Plate Apples.

Largest Apples.

Plate of Quinces.

Plate of Grapes.

Plate of Persimmons.

Plate of Oranges.

Collection of Nuts.

Best Red Sweet Potatoes.

Best Yellow Sweet Potatoes.

Best and Largest Pumpkin.

Best Display Canned Fruit.

Best Display Preserved Fruit.

Best Display Evaporated Apples.

Best Display Evaporated Peaches.

Best Display Vegetables.

4. At Washington, D. C., in 1913, the Wilder, which is considered the Society's highest award.

**CONCENTRATED AND CONDIMENTAL FEEDS.**

Analyses of concentrated and condimental feeds are under Dr. J. M. Pickel in connection with the State Chemist. A bulletin is published each year showing analyses, and that of condimental feeds shows the high prices which farmers are paying for simple medicines as salts, charcoal, copperas, saltpetre, etc. A license of \$20 is charged for each brand of condimental feeds and 20 cents per ton for feeds sold in the State.

**PURE FOOD AND OILS.**

This is a division of this Department of which Mr. W. M. Allen is in charge. A bulletin of foods inspected is published every year, and those now sold in the State show much less adulteration than when the Bureau was organized ten years ago. Artificially bleached flour is required to be branded and a registration fee of \$25 for each brand is required.

**BOTANY AND AGRONOMY.**

A license of \$25 annually is charged for selling seed in the State, but a license permits all persons who buy from the firm paying it to sell. Samples are collected by the inspectors and a bulletin of those analyzed published each year. The law states the per cent admissible both for purity and germination. Seed not complying with the law are expelled from the State. The Agronomist visits farms when requested for suggestions as to improvements, and manufacturers legume inoculation which is sold at forty cents per acre, to citizens of the State while the commercial price is \$2.

Corn is the most valuable crop and the advances from selecting seed and applying culture have been great, the amount per acre having advanced 12.8 bushels per acre in 1900 to 20.3 in 1914.

#### THE BLACK LANDS OF EASTERN NORTH CAROLINA.

These embrace several thousand square miles, and when drained produce corn at an astonishing rate as to quantity and cost of production. When the lands are drained, in the fall or winter the land is cut over broadcast, for about seven dollars per acre. In March this land is burned over and in April a man will take a "hand spike" and throw the partially burned logs in the most convenient position for his purpose; then with a small bag or pocket full of corn, he will go over the field about as corn rows would be run, and making holes with the *spike* about 18 inches apart, drop two grains of corn, which he covers with his foot. This is called a *stuck crop*. Nothing more is done except keep the weeds and sprouts down. The corn will frequently make 100 to 150 bushels per acre, and 25 to 40 bushels of soja beans additional. Often the stuck crop of corn will pay for the purchase money and clearing of the land and producing of the crop.

This seems to my audience as a wonderful statement, but I speak that I do know and testify that I have seen, and any one who doubts can have doubts removed by visiting this section in August next.

#### THE SAND HILLS.

This is also a noted section of the State, embracing several hundred square miles in the counties of Moore, Cumberland, Richmond and some adjoining counties. It has from earliest times been regarded as the poorest part of the State and the equal in poverty of any part of the earth. The atmosphere of the piney woods (the long leaf pine covered the country) was found beneficial to persons suffering with pulmonary diseases. Resorts were erected, the attention of men of wealth was attracted to the country and large hotels were built, also cottages or dwellings by individuals.

The land is fine for grapes, peaches and plums, and large orchards are cultivated, some of several hundred acres in extent. Then followed experiments in agriculture which have been a revelation; with applications of properly prepared fertilizer the land yields fifty or more bushels of corn or a bale of cotton to the acre. The country grows burr and German clover, rye and vetch, which are all valuable crops for land improvement and furnish in addition fine winter pasture. Mr. Tufts' Berkshire hogs and Ayreshire cattle are esteemed the equal of these breeds to be found anywhere.

#### THE THERMAL BELT.

There is along the eastern face of the Blue Ridge Mountains a strip of land known as the Thermal Belt, because frost does not occur upon

it. When frost comes you can see its effects above and below this belt while the belt is still green, and in the spring it will revive before the other land. It is the home of the finest apples and grass.

The National Department, in coöperation with the State Department, is making a survey to locate the boundaries of the belt and ascertain to what the absence of frost is due. The thermometers frequently record a lower temperature at the base than at several hundred feet altitude, sometimes extending to the top of the mountain. It is located in Polk, Henderson, Transylvania, Buncombe, Haywood, Mitchell, Watauga and Surry counties.

#### DRAINAGE.

A company is now draining the Mattamuskeet lake district, which embraces one hundred thousand acres, sixty thousand of which is now accessible to drainage; and the bed of the lake is now being drained by pumps as is done in Holland. The project will require 125 miles of large size canals, sixty per cent of which are completed.

Wilkinson Bros. cut a canal 65 miles long, 14 by 10 feet, and then cross-cut and draining in sections of 50 acres. Drainage districts are formed by landowners in localities, bonds issued for expenses and commissioners appointed to manage the affair. The bonds are good security and so far have been easily sold and the interest never defaulted. Some would say this is a malarial country and full of mosquitoes, but it has been shown in Panama and elsewhere that drainage takes off mosquitoes as well as water.

How long will this land remain productive? There are farms here which have been cultivated seventy years and still produce good crops. The main requisite is lime; there are large quantities of marl and lime accessible in beds, the oyster and other shells.

Many of the Piedmont counties have formed districts to straighten the creeks and reclaim land which has been abandoned, because not accessible for drainage. Perhaps a million acres will be restored to cultivation.

The Department has no connection with the general drainage, but in connection with the National Department has engineers to give advice as to farm drainage, and laying tile, after it is in farms. Several hundred acres of land, in the Piedmont section, has been drained by the drainage district plan, and will increase the corn crop several million bushels, and render the section free of malarial complaints.

#### COTTON.

The North Carolina farmer is the best cotton farmer in the nation, as has been proven by his leading in acre production, for the last five successive years. It is true that he uses fertilizers, but that shows his knowledge, as the use of fertilizers is profitable, if the fertility of the land is preserved. The custom to sample cotton by simply considering color of staple and freedom from trash has been a great injustice to the farmers. The true value of cotton is the length of lint and tensile

strength. When the Government authorized the Secretary of Agriculture to make standards, the North Carolina Commissioner called attention to this matter and these items are now considered in fixing the standards, and the farmer will receive more for his cotton.

Effort is now being made to persuade the United States Department to endeavor by an International Convention to abolish the unjust manner of deducting tare for bagging and ties, in the cotton trade.

#### TOBACCO.

The quality of the North Carolina brights is of the highest grade and commands the highest prices. The State is second in value of tobacco crop, Kentucky having first place with an acreage of 400,000, while North Carolina has 138,813 acres. Kentucky tobacco sells for 10 cents per pound, North Carolina at 18½ cents.

In its area of 500 miles in length and near one hundred in breadth, extending from its projection into the Atlantic to Tennessee, from the plains of the ocean coasts to the highest mountain peaks, the State gives a variety of soil and climate which will produce in abundance almost any crop grown in the Nation; and when inquiries are made by those considering removing to our borders, the reply is generally, "State what you wish to follow and we can tell you where to locate."

#### SEMI-TROPICAL CLIMATE.

Fayetteville is on the 79th western meridian, exactly south of New York City. The State extends three hundred miles east of this and puts one-third of the area that much nearer the Gulf Stream and renders much of the climate sub-tropical. The Gulf Stream is twenty miles east of Hatteras.

Much more could be said of the achievements, but it would not leave space to speak of some of the problems to be solved.

#### PROBLEMS.

Among the problems to be solved are:

1. A home-owning yeomanry on farms that make their support is the great desideratum, and that they may produce food and feed enough to supply the State. The State was prosperous under this system and we think will be again when it is restored. There is much truth in the old darkey's position, who was going along in ragged clothes and badly worn shoes, with a sack of flour under his arm and a side of bacon on his head. Being asked why he did not buy less rations and more clothes, replied: "Boss, when my back or my feet calls on me for supplies, I can put it off with a promise, but when this (putting his hand on his bread basket) calls, I am bound to have the cash." Farms which furnish the *cash* are needed.

The younger generation, with the advantages they have of preparation, ought to fit into their places as they come to them, but it is neces-

sary to interest the adult farmer; in the future, as it has been in the past, by such means as may be necessary to retain his attention and increase the coöperative work.

2. Coöperating in buying and selling. We seem to have inherited the characteristics of our fathers. The North was settled in hamlets where they were closely associated, and interested themselves more or less in the affairs of their neighbors, while the Southern man went to his farm and seldom saw his neighbor except on business; hence the northern man is more easily brought into coöperation. Either trait can be developed to an extent which is unpleasant if not unprofitable.

There usually is as much in the selling of the crop as in the making, and a good amount can be saved by coöperation which is now lost by individual handling. This has often been demonstrated; it is singular that the farmer neglects it. As I wrote the Secretary of Agriculture, the National Department can not formulate a system suitable to every section and pass it down to the farmers, but it must start in the neighborhood where the goods are produced and combine the farmers interested; then let two neighborhoods unite, then a township, county and so on. But the farmer is impatient; he expects to do things on his farm in a year, and that is about as long as he will quietly wait for anything. He is learning and this will come, as he sees it is the practice of other professions, and the crop four or five years hence and not this year is to be the aim.

Coöperation or working together in all matters where there is a common interest. The right thing done at the wrong time or in the wrong way is as harmful as if the intention had been wrong. The following anecdote illustrates this. John, on a trip to town, bought a pair of pants which fitted him except they were two inches too long, thinking his wife could remedy this. Arriving at home, where his sister and niece were visiting, he stated what a bargain he had made and asked his wife to fix them so he could wear them to church next day. She replied, "John, you know this is Saturday night and that I have no time to fix your pants." After supper the niece quietly got the pants and cut off two inches to help auntie so that Uncle John could wear his pants to church. The sister thought, "I know Sarah is tired and I'll fix brother's pants so he can wear them." She got the pants, cut them off two inches and hung them up. After eleven o'clock, the weary wife, just as she had intended to do all the time, says, "Well, I'll fix John's pants," and she did and hung them up again; and each of the three went to bed feeling good that John could wear his pants. Next morning John arose, "nursing his wrath to keep it warm," determined to wear the long pants so as to mortify his wife for not fixing them. He jerked them on expecting to find them clinging around his ankles and heels, but instead he found the chilly air occupying that locality, and casting his eye thither he discovered that he resembled a man going for a game of baseball rather than going to worship. He jumped up



and down and used words to express his feelings that you can not find in the largest dictionaries.

These three persons, with the best intentions, ruined a pair of pants and disappointed a man in going happy to church by not coöperating. The things done cutting off two inches were not only proper but necessary; there was too much of a good thing and it became evil, but it was the same to John as if they had agreed to ruin his goods.

How true this picture is in many homes and communities. I once told this where it had actually occurred as far as two cuttings were concerned, and John was accused of telling me.

3. In thinking. Attending institutes and other assemblies and participating in the proceedings and in performing the deeds proposed.

4. In borrowing. The State has a law as to Rural Credit from which it is hoped to develop some system agreeable to our people. As it is in all other matters, an increase in Rural Cash will aid greatly to solve Rural Credits. Rural cash will only come by having the outgo to be less than the income on each farm.

5. A Currency System that will furnish money to meet the increased amount of goods by the appearance of the farmer's crops in the market—that they shall not suffer in price until the farmer has sold and that the new goods or crops be used as the security for the new money needed. This is largely provided for in the new act by making the warehouse certificates good security to borrow money. This is all that there is in the sub-treasury scheme advocated by the Farmers' Alliance. It is grateful to those of us who favored it to see this. The Government has confessed that the farmer knew from the first from what he was suffering and proposed the best solution—not "or something better," but the idea he advocated was the best remedy for relief.

It has been a pleasure to make this imperfect report of conditions present and future of the Old North State. While the State has by natural production attained an additional member of Congress each apportionment, there is room for many more desirable people to come to us and help develop the resources. If you come you will know who your neighbor is and what has been the character of his ancestors for a hundred years.

Our school system is now well administered and I do not think any other State has a system better suited to its people. The census men tell us that the State is almost at the bottom in illiteracy. I can not say this is not true, yet when you examine the figures which I have given you, you must conclude that the tar heel farmer may be illiterate, yet he has advanced much further in practical affairs and added much more to the wealth of the country than the farmers of other States who have much better educational attainments. A man may not be able to think and reason as to the cause of results, yet he can *observe* and see that "that is right which we do," and frequently surpass the thinkers in results obtained. Although illiterate he is not ignorant, and the man

who would shun him on account of illiteracy misses the opportunity to associate with a gentleman worthy of his notice and desirable as a citizen.

#### ILLITERACY IS NOT IGNORANCE.

While the illiteracy is to be regretted, what good is accomplished by the insistent publication to the world? Illiteracy is generally considered ignorance; this is a great mistake. Few stop to consider the matter, but adopt the common verdict. The characters of our people are injured by this course now as was the case in former times. The North Carolina Confederate soldier, on account of this publicity, at the beginning of the war did not have the respect of his fellows, but was the object of much ridicule, and all kinds of ignorant expressions were attributed to him, as "the seventh rigimint spider wagon"; "the sixth rigimint hoss-pistol;" "you got any tobacco?" "No, but I've got some of the best rosam (rosin) you ever chawed." Such conduct and expressions could be greatly multiplied if desired. In 1862 "tar-heel" was introduced as a term of ridicule. The boys replied in different styles, "Got any tar?" "No, Jeff Davis has bought it all." "What for?" "To put on you fellows' heels to make you stick." The fourth Texas had lost its flag at Sharpsburg. Passing the sixth North Carolina a few days afterwards they called out, "Tar-heel," and the reply was, "If you had had some tar on your heels, you would have brought your flag back from Sharpsburg." It was recognized as a term of affront until 1864. Governor Vance, when he visited the army of Northern Virginia, in opening his speech said: "I do not know what to call you fellows. I can not say fellow soldiers, because I am not a soldier, nor fellow citizens because we do not live in this State; so I have concluded to call you fellow Tar-heels." There was a slight pause before the applause came and from that time "Tar-heel" has been honored as an epithet worthy to be offered to a gallant North Carolina soldier.

I have shown in the foregoing paper the position which the North Carolina farmer has attained among those of his profession in the Union, and that he deserves the respect of his comrades, but if some one follows this publication, with one stating that fourteen in every hundred can not read his ballot, or circulates this at Conventions, where such information as this paper is given with a view to induce people to settle with us, a tendency to *emigrate*, rather than to *immigrate*, is produced.

A man is not valuable to the State on account of his ability or eloquence, unless he uses them to promote the interests of his community. The man who improves the conditions of the farmer adds to the wealth of his community and contributes to its material advancement, and is more valuable than the best educated man, who keeps his gifts to himself. I wish to enter my protest on behalf of the adult farmers of the State, whom the State Board of Agriculture has developed into the

most valuable portion of the citizenship, so far as production of wealth and happy conditions are concerned, and the equal of that of any other Southern state, against this injustice. I protest against their being exhibited to the world as undesirable citizens. I desire to see illiteracy removed but doubt the publicity manner of accomplishing it.

A man should not be told that there is nothing that he can do, since he is illiterate, but he should be encouraged to do whatever he can do for the betterment of his community. Let illiteracy be curtailed, and abolished if possible, but do not let it be unnecessarily published to the undeserved detriment of our people.

The farmer is making commendable progress now, and when all are educated the Good Old North State will, indeed, be in the front rank.

"Here's to the land of the long leaf pine,  
The summer land, where the sun doth shine,  
Where the weak grow strong, and the strong grow great,  
Here's to down home, the Old North State.

"Here's to the land of the cotton bloom white,  
Where the scuppernong perfumes the breezes at night,  
Where soft southern moss and jessamine mate,  
'Neath the murmuring pines of the Old North State.

"Here's to the land where the galax grows,  
Where the rhododendron roseate glows,  
Where soars Mount Mitchell's summit great,  
In the 'Land of the Sky,' the Old North State.

\* \* \* \* \*

"To the land where there's plenty of corn  
To the State where Liberty was born  
The home of the goober, and the sweet potato,  
'Down home,' God's country, the Old North State."

## NORTH CAROLINA, THE LAND OF OPPORTUNITY

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Address of BION H. BUTLER, Before the North Carolina Press Association,  
Wednesday, June 24.

Recently I said one day in the *News and Observer* that North Carolina is "sloppy with opportunity." That expression has been brought back to me to set the pleasant task of pointing out some of those opportunities and telling how the newspaper men may help in the development of them.

Thirty-two years ago this summer I caught my first glimpse of North Carolina. At that time I had seen enough of the industrial development and progress of the United States from Texas, Kansas and Minnesota east to New England to appreciate what development means and to recognize the opportunity for development where it appeared. Fifteen years of my newspaper work was passed as a writer of the progress of the big industrial expansion in the Pittsburg territory where big things are done. That gave me a further insight into what opportunity is and what it is worth. It is more than twenty years ago that I commenced to write in the *Pittsburg Times* stories of opportunity in North Carolina. In that twenty years I have been showing people what I see here, and in going out to show them I continually fall over more things to show. I did not discover North Carolina all of a sudden. It has been a gradual finding of new possibilities until it is easy to see that no State in the Union today can present so much of opportunity as North Carolina. This is said in all deliberation, for unsupported claims are of no use to anybody. It is folly to deceive ourselves. I make this claim after an acquaintance with almost every community of consequence in the United States.

### THE CONTROLLING FACTORS.

The chief factors that are putting North Carolina in the front are climate, rainfall, waterpower, transportation, convenience to the markets of the United States and of the world, the permanent supply of raw material for factory use, and a population of intelligent and upright character. I do not include those temporary resources like timber, mineral deposits, etc., which, valuable in themselves, and of great importance, are still temporary, and not in the same class with those permanent things that are of everlasting worth.

In hunting the best place for a home for myself and my family I picked North Carolina from all the rest of the country after weighing all factors, because it offered a bigger inducement in natural advantages. It has the best climate and the best rainfall. Climate makes a State fit to live in. Rainfall and mild climate make it an agricultural possibility. Soil is a factor, but fertility can be made. Kansas and Califor-

nia and other States of the West are not so fertile now as when I first knew them. North Carolina is more fertile. Fertility is under the control of man. Climate and rainfall are not.

Therefore we must regard North Carolina as one of the foremost agricultural possibilities on earth. The story of the last fifteen years bears this out. In the last census period the State more than doubled its farm products. In the last five years it has almost doubled again. Or, in five years the State made the phenomenal record of advancing as far as in the more than 300 years from the day of Raleigh's first colony up to 1900. This is without parallel probably. This surprising record if kept up another ten years, will put North Carolina among the first three or four States of the Union.

Mill development is fully as rapid. Fourteen years ago the State factories produced about \$6 million dollars worth of goods. Now they make three times that value. Factories are springing up to build the widest variety of products. The factories are diversified to scores of different lines. They will diversify more because they have the power. In a dozen years the development of waterpower in North Carolina has been one of the marvels of the industrial world. What is ahead nobody can guess, but almost any guess seems safe enough. The State is grid-ironed with power wires now and in that respect has no peer on the globe.

#### A SELF-CONTAINED STATE.

Ours is the one State that is self-contained and self-providing. It has the farms on which to feed the people, the factories in which to employ them, the power to run the mills, the yearly crop of raw material for the factory, the river and sea to carry the freight to market, the railroads in all directions, besides the surplus of product eagerly sought by other States.

Rising in the highest mountains east of the Rockies, North Carolina rivers have more fall to the sea, a greater distance to the sea, a greater annual rainfall to carry down, and a greater area to drain water from than any other State of the east. No other State has all these advantages like ours has. How much power that means is pure guess. It is a limit we cannot overtake for years. We have no idea of the limit of our ability to produce cotton for the ever growing needs of the world, or of fruit and vegetables for the rapidly growing North, or of anything. We have no idea where we are going, but we are headed somewhere, and are running away on half a dozen roads at one time.

It is no use for me to point out to you the opportunities of North Carolina. Five thousand people could find opportunity in Jones County to go to raising cotton. As many more could go to the mountains to raise cattle. As many more could go to Guilford to raise corn, to Moore to raise scuppernongs for the grape juice plant starting there, to Henderson to raise apples, to Robeson to raise cantaloupes, to Cumberland to raise tobacco, peanuts for oil, sweet potatoes to make starch for the

cotton mills and alcohol for the arts and for the automobiles when gasoline is scarce.

#### OPPORTUNITY IN EVERY COUNTY.

Every county in the State could place ten thousand people as fast as they could come and opportunity would await them. One of the greatest of advantages is that our resources are so distributed that in every township in the State it is possible to establish a varied industry. Here is one State that has power available in every locality, raw material in every locality, transportation in every locality. We do not have to bunch our industries in cities where coal and iron and shop room can be had, as is the case in other States where the utilities must be assembled. We are not compelled to crowd into centers of population. Look at the cotton mill development that lines the Southern Railway from the Virginia boundary to the South Carolina frontier. It is a continuation of mill communities with their farm settlements about them. At the last census North Carolina ranked eighth among the States in its rural population. Only seven other States are developed all through the rural regions more than ours. In city population this State ranks thirty-first, but we are practically alone in having farm and factory property developments scattered over the entire State. The farm is where it can feed the factory and supply such raw material as cotton and tobacco, and the factory is where it can benefit by the farm, and find labor and subsistence and afford a market. Every manufacturer knows the economy of a shop away from the high rents and high living costs of the city.

North Carolina is "sloppy with opportunity." I can no more tell you the limit of that opportunity than I can tell you the limit of the water of the ocean out there in front of us. This one single thing of electrical development that has commenced in the State means a revolution in industrial things, with North Carolina as a cradle of expansion and a training ground. Ten years from now the electrical atmosphere of industrial North Carolina will be a marvel.

#### DUTY OF PRESS.

You realize the opportunities. How can the press help to develop them? By becoming thoroughly familiar with what is here. We know of many opportunities, but there are many we have overlooked. We must become familiar with as many as possible, and get our people to know and appreciate them. My people laughed at me for an enthusiast when I told them North Carolina has the best climate in the United States. I showed them the weather bureau statistics which tell that in every State along the Canadian frontier except New York and New England the thermometer goes higher in summer than in North Carolina. They are surprised when I tell them the Catawba has power enough to turn all the wheels of Connecticut, a prominent factory

State, or that one big dam building on the Yadkin would run two-thirds of all the wheels in Vermont. The newspapers must put these things before the people vigorously. In the North and East North Carolina is an unknown region, almost as far out of public knowledge as Roosevelt's river of doubt in the Amazon country. Every North Carolina newspaper should have several exchanges in the North and in New England that what is printed might be passed along to people elsewhere.

The newspaper must be a clearing house for information concerning the State, the county and the town. Every new farm, every new factory, every new thing that tells of development and expansion should get a place on the first page with a two stack head. I figure in our paper that building a dozen new tobacco barns on Pinebluff farm is of more consequence than the vote for the candidate for Congress or Governor.

#### AN EXAMPLE.

An example of this helpful enthusiasm in the *Southern Pines Tourist*, one of the most aggressive development factors in the State, as well as a model village newspaper.

I don't mind telling you a trade secret if you will go home and profit by it. Every time we start something new over in Hoke County we try to tell it to the *News and Observer*, the *Charlotte Observer*, the *Star*, and all the other papers that want to know what is going on in the State. They can't keep a secret and they tell it to their readers and every few days you notice that something new is breaking loose in the Sandhills. I don't know whether our section is any better than yours, but we go on the theory that our section is the best on earth, and our favored bird is not the American eagle, but the wise old hen who makes a note of the occurrence every time she lays an egg, and alludes to it several times during the day, before and after laying it. We believe in advertising.

#### PEOPLE THE NEED.

It is useless to enumerate the opportunities in North Carolina. We could accommodate in this State many millions of people. People are what we lack. We lack people because the rest of this country, which is supplying settlers for all the United States and Canada, does not know North Carolina. Within the next year, and nearly every year, a million or more Americans will hunt new homes. They will not find anything better than North Carolina, but they will go elsewhere for want of knowledge of North Carolina. You who print papers in the tobacco belt should get some of your papers into the hands of people in the tobacco sections of Pennsylvania, Ohio, Wisconsin, and elsewhere. You, in the corn counties, should be in touch with people in the corn country of the North and West. The climate of the North and West is fierce and people are running away from it constantly. Our climate is one of our greatest assets, and when it is known what a climate we have and what other advantages, we will get people.

## PUBLICITY BUREAU WOULD HELP.

We should have an aggressive publicity bureau in the association. The Western States spend hundreds of thousands of dollars to settle their country which is not half so attractive as ours, but they settle it, and get their money back in the increased business. They get marvelous and rapid results. If California, with the hustle those folks have, should unite the rainfall of North Carolina and the climate to their hustle they would make five million bales of cotton a year and spin it. On the sandy lands of this State could be made crops to feed millions of the people of Europe if farmers were here to use the available cheap land. The United States makes fifteen million bales of cotton a year. The cotton States of the South constitute the only part of the globe that makes enough cotton to satisfy its needs. In the United States we, each of us, use an average of about thirty pounds of cotton a year. In most of the world the average amount for each individual is not above three pounds. To provide the world liberally with cotton would take a crop of a hundred and fifty million bales a year. North Carolina is the safest cotton State on earth and raises more to the acre than any other State. Half the world has never yet had half enough clothes to be comfortable because never enough was raised. North Carolina is making more cotton goods every day, and every day the commerce of the world is expanding into figures of gigantic importance. The work is to be done. We need more people to do it. As far as we can see we will never reach our limit in this State. We have no limit of rainfall and sunshine. We have land enough to stagger our conception. What we lack is people. We need to show people that anything that can be done in any section of the United States can be done to a little better advantage here, with few exceptions. We can make as good cantaloupes as Colorado, and a thousand miles nearer market. Yet Rocky Ford melons are known everywhere and Scotland County melons sell for Rocky Ford.

## "LORD HAS BEEN TOO GOOD."

Think what rainless Montana or Idaho would do with our rainfall and convenience to market. Yet those people are no more intelligent or industrious than our people. They simply have to pump or drown out there, and they pump and show other people they can pump. The Lord has been too good in this State. Here it is not so necessary to pump and we overlook the amazing advantages. We do not appreciate them sufficiently to talk of them to others.

I think you understand as well as I can tell you that here is a land of boundless possibilities. If I were to be asked how many people North Carolina could sustain in comfort I would say that Belgium sustains thirteen times as many people to the square mile as we do, and they seem to live in comfort there, and with not so much of natural advantage to depend on. Using Belgium as an illustration I would say that thirteen times as many people as we have now, or around twenty-five millions,



would be about the number I would recommend to start with. When we get that many we could figure on how many more to think about. Belgium has as much territory as the coastal plain of North Carolina, and as many people as both the Carolinas, Virginia and Maryland, which is all that need be said about the room for people in this State.

### WE MUST GET THE PEOPLE.

To promote development we must get people. I don't count myself an old man, yet I remember when we spoke of Ohio as out West. From the day when this government was established it has been an average of only a little more than three years between new States. The people to make new states are increasing faster now than ever. The new states are all made. The people will go on making farms and factories and towns and communities, and they will follow the lines of least resistance in finding the place if they know where those lines are. To show them is our task. To get those people is our need. There are plenty of them to be had.

The first part of the work is to become thoroughly familiar with the work ourselves, then to show our home people that we have here something that should be made known to those of the big world who are looking for a chance to do something for themselves. We must arouse our own State that it will help us to attract attention. Then we must go after settlers. The papers must furnish information. The papers must arouse the enthusiasm of the people. Then the papers must lead the campaign of publicity.

You must, each one, constitute yourself the aggressive agent of development of your county and your community, make your paper its enthusiastic organ, and then as one of my darkies said one day while wrestling with a piece of obstreperous beef, you must chaw for godsake.

When you get your job started stay with it. Of all the remarks that have been made about me as long as I can remember the one that pleased me most was that of a man who said of me, "That fellow never knows when to quit."

Friends, let us go home from here determined to cut out the muffler, open the throttle wide, advising the rest of the world to excuse the dust as North Carolina whips past.

Approved for publication:

W. A. GRAHAM,  
*Commissioner.*

### LEAF TOBACCO REPORT FOR MAY, 1915.

Pounds sold for producers.....	773,584
Pounds sold for dealers.....	107,407
Pounds sold for warehouses.....	36,486
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	917,477

**THE BULLETIN**  
OF THE  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE,**  
**RALEIGH**

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Vol. 36, No. 8.

AUGUST, 1915.

Whole No. 211.

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**CANTALOUPE GROWING IN NORTH  
CAROLINA**



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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Post-office at Raleigh, N. C., as second-class matter,

February 7, 1901, under Act of June 6, 1900.

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†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In cooperation with the Bureau of Plant Industry, United States Department of Agriculture.

## LETTER OF TRANSMITTAL.

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RALEIGH, July 20, 1915.

HON. W. A. GRAHAM,

*Commissioner of Agriculture.*

SIR:—I herewith submit the results of experimental trials made with cantaloupes on the Pender Test Farm and of observations on conditions of culture and marketing of this crop throughout the commercial cantaloupe regions of the State by Mr. R. G. Hill, Assistant Horticulturist. I recommend that this bulletin be published as the August BULLETIN of the regular Department series.

Respectfully submitted,

W. N. HUTT,  
*State Horticulturist.*

Approved for printing.

W. A. GRAHAM,  
*Commissioner.*



# CANTALOUPE GROWING IN NORTH CAROLINA.

By R. G. HILL, ASSISTANT HORTICULTURIST.

The importance of the cantaloupe as a truck crop in the eastern section of this State has not been generally recognized by the State at large. It is one of the important crops grown, both commercially and for home use. It is a popular crop, the reason for its popularity being the ease with which it is handled, the ease of production, and the demand for the fruit itself both in the home and the distant markets.

It is grown for home use in all sections of the State, but is grown commercially only in the eastern or coastal plain section. The centers of production, at present, are in Moore, Scotland, and Robeson counties; Wake, Duplin, and Wayne, and Warren counties. These counties seem to be particularly well adapted to the melon industry and ship annually the largest proportion of the crop grown in the State.

Notwithstanding the fact that the cantaloupe is so generally grown, many growers are not familiar with the best cultural methods, and as a result many inquiries as to the best methods of cultivation, handling, etc., are received by this office. In order that these requests may be more fully answered, the essentials of successful culture are discussed in the following pages.

Among the many conditions necessary for the profitable production of cantaloupes for the commercial market, special study must be given to the type of soil, climate, and shipping facilities.

The soil should be preferably a sandy loam which will admit of early and frequent cultivation. It should be warm, fairly rich, with plenty of moisture, but under no consideration should it be wet.

The climate should be warm enough to allow a steady growing season without a check, for when the plants are once checked in growth they begin to deteriorate and will not produce fruits of high quality.

Shipping facilities should be adequate in order that the crop can be placed on the market in the shortest possible time after it is picked. Without these three important factors, the possibilities of establishing a paying cantaloupe industry would be greatly lessened.

## SOILS AND THEIR PREPARATION.

While cantaloupes will grow on nearly all types of soil, a well-drained sandy or sandy-loam soil with a clay subsoil is ideal. Experience has proved that cantaloupes will thrive best on light sandy loam. Other types of soil will produce good crops, provided they are well drained and in good tilth; but the clayey types are inclined, on account of their coldness, to produce the crop too late for the distant markets. There seems

to be a prevailing idea that it takes sandy bottom-land to produce good quality fruit. This is to a certain extent true; but sandy uplands with clay subsoils and favorable drainage will also produce very fine melons. This is proven by the excellent quality of stock produced by growers in the region of Warren County.

The general belief is that the nature of some types of soil has a great influence on the shape, size, and quality of the melon. As a matter of fact, it is not so much the soil as it is the effect of the varying seasons and closeness of planting. In favorable seasons the percentage of large size or "Jumbo" melons is increased, while in seasons unfavorable to growth the percentage of small or "Pony" melons will prove to be large.

Earliness is a fundamental essential to success. To get an early crop the soil must be quick, warm, and fertile. The best results are obtained when the soil is in an ashy, mellow condition; therefore, the preparation must be deep and thorough. The soil should have been in cultivation during the previous season. There is nothing that will be so advantageous to the cantaloupe crop as a crop of clover or cowpeas plowed under. The effects of this treatment will be seen in the increased mellowness and moisture-holding capacity of the soil, as well as in the increased amount of nitrogen added. Deep plowing and careful harrowing will do much to bring about favorable soil conditions. A good crop rotation will be very beneficial. One of the best to follow and one that is used by many of the successful growers is a three-year rotation consisting of cotton, corn, and cantaloupes, with cowpeas planted in both the corn and cantaloupes. The cowpeas planted in the corn are plowed under, adding vegetable matter to the soil, and making it loose and friable. The legume crop, with the cantaloupes, produce, with the crabgrass that grows voluntarily, a good crop of hay.

#### FERTILIZERS.

The soils generally used for the commercial production of cantaloupes are not, as a rule, of sufficient richness to produce large crops of fruit without the addition of some form of manure. Where it is possible, stable manure should be applied, since it furnishes both plant food and humus. Unfortunately, the supply of stable manure is very limited, and dependence must be placed for the source of humus and plant food on green manures and chemical fertilizers.

The amount and kind of fertilizer applied depends entirely on the natural fertility and the previous treatment of the land. The cantaloupe requires an abundance of vegetable matter, which may be secured either by the use of stable manure or from some leguminous crop.

Stable manure when applied should be well rotted and well incorporated with the soil. It may be broadcasted or placed in the furrow. Broadcasting has its advantages, but where only a small quantity is available, it is better to place it in the seed-beds.



Green manures should consist of a legume, either clover, cowpeas, or soy beans. These crops turned under will add nitrogen in addition to the humus, and will also improve the texture of the soil and make it more easily cultivated, besides increasing the bacterial activities so necessary to plant life. These crops should be turned under early, in the late winter or very early in the spring, and before plowing under they should be disked in order that they may be well worked in the soil. In addition to the green manure which is depended upon for the source of the larger share of nitrogen, chemical fertilizer must be added to supply the potash and phosphoric acid. Where it is impossible to have either stable or green manure, a complete fertilizer must be used. This fertilizer is made up of different substances, all of which contain some form of nitrogen, phosphoric acid, or potash derived from organic or inorganic sources. A complete fertilizer contains all three of the principal elements of plant food.

There is no set rule for the application of specified amounts of chemical fertilizer to be used. The amount and kinds will vary with the location and the conditions under which it is to be applied. Generally speaking, the light soils best adapted to cantaloupe growing are well supplied with phosphoric acid, but are deficient in nitrogen and potash. Each grower, therefore, must determine for himself the amount and kinds of fertilizer best suited to his particular location. Since soils of the same type in different localities require different mixtures, it must be borne in mind that to secure the best growth it is necessary that the mineral elements be readily available. The vines do best only when they have a steady and continuous growth. In no way must this growth be checked. To secure a steady growth too much nitrogen in the form of nitrate of soda must not be used, since it is of quick action, but of short duration. If it is possible to secure only nitrate of soda as a source of nitrogen, it must be applied in small quantities in different applications. The source of nitrogen from different compounds, such as dried blood, tankage, cotton-seed meal, etc., mixed with the nitrate of soda, give the best results because they allow for continuous growth of both vine and fruit. The most universally used formula throughout the commercial cantaloupe sections is:

Available phosphoric acid - - - - -	8 per cent.
Nitrogen - - - - -	3 per cent.
Actual potash - - - - -	8 per cent.

or,

Available phosphoric acid - - - - -	8 per cent.
Nitrogen - - - - -	4 per cent.
Actual potash - - - - -	10 per cent.

These formulæ are made up of nitrate of soda, cotton-seed meal, acid phosphate, and muriate of potash. Good results have been obtained by

the substitution of either dried blood, tankage, or fish scrap for cotton-seed meal. The best results are to be obtained by modifying the percentage of phosphoric acid and potash to suit local conditions. The following formula has given good results on sandy soils:

100 pounds of 16% acid phosphate.  
400 pounds of cotton-seed meal.  
150 pounds of nitrate of soda.  
150 pounds of muriate of potash.

Using 1,000 pounds of the above formula at one application, followed by a second application made up of

75 pounds of nitrate of soda,  
75 pounds of muriate of potash,

applied as a top dressing.

The amount used should vary from 800 to 1,000 pounds per acre, applied in the furrow. In all cases this should be well stirred into the soil some two to three weeks before planting. Later, when plants have obtained considerable size, or even just before the last cultivation, a top or a side dressing of about 100 pounds nitrate of soda to the acre should be applied. A good rule to follow is to fertilize so that the plants will get a good start, remembering that the thinner the soil the greater the need for nitrogen.

#### VARIETIES.

The question of varieties to the cantaloupe grower is not complicated. The popularity of the Rocky Ford type of the Netted Gem has proved to be so great that there is little or no demand for other varieties. In fact, the demand for it is such that this type has become the standard as far as southern growers are concerned. However, there are many types of the Netted Gem, all of which have very favorable qualities. The many types have originated mainly through the efforts of growers and breeders to produce vines which are prolific and, still more important, resistant to disease. It is through the efforts of Prof. P. N. Blinn of Colorado and others associated with him that so much has been done to produce the Rocky Ford type which has proved to be so popular and has practically revolutionized the cantaloupe industry.

Among the various types grown in this State may be mentioned the Early Rust Resistant. In tests conducted on three of the State Test Farms, and also in coöperation with growers, this type has proved to be very prolific and from three to eight days earlier than other Rocky Ford types.

The most popular types grown commercially are the Netted Rock, Rock King, Green and Salmon Pollock. At the Pender Test Farm the Pollock types have proven to be excellent both in yield and resistance to

disease. These melons produced uniform Jumbo sized fruits of excellent flavor and appearance. The flesh is very firm, of fine texture, highly flavored, and of medium thickness. The netting is well developed and of fine color. They are excellent shippers.

### SEED.

The question of good seed is a matter of vital importance to the cantaloupe grower. The value of the fruit and its influence on the market make it advisable for the grower to avoid planting anything but seed which will produce early melons of ideal type and quality.

Good seed is expensive, but when compared with the value of a crop of fruit the cost is a comparatively small item. A good many growers buy whatever seed is cheapest and trust to luck that it will turn out all right. This is the straight road to failure. Fortunately, the markets now demand but few of the standard varieties, most of which are closely related to the Rocky Ford type of the Netted Gem; but there are many types of this variety, and it is well to exercise care in securing seed in order that it will produce the type of melons demanded by the markets.

The placing of poor seed on the market is due largely to individuals making their own selections of seed and at the same time having different ideals as to the true type of cantaloupe, or not having knowledge as to what constitutes an ideal melon. On account of this, a large percentage of the fruits produced bring poor prices when placed on the market, because they lack uniformity in size, shape, and quality. Generally speaking, the flesh is soft and lacks the fine flavor so characteristic of a good cantaloupe.

In an effort to determine to what extent the home saving of seed is practiced, a local market was visited and twenty melons were indiscriminately picked from the various stands and wagons. Among these melons were many types, some of which could be recognized, but with the majority the original strain was so lost as to make identification impossible. (See Fig. 1.) Those that were known were the Hackensac, Emerald Gem, Banana, Casaba, and Jenny Lind. Even these were not strictly true to variety. Each melon was tested for quality, etc., and, with the exception of the Hackensac, was found to be far below the standard. They were soft in texture, thin fleshed, and were so run out that the flavor was absolutely lost. The growers of these melons were questioned with a view to discovering the source of seed. In every case it was found that the grower either saved his seed or purchased it from a neighbor. Not only are the growers for local markets lax in securing good seed, but some growers for distant or general markets exhibit the same tendencies. During the past season many cantaloupe fields were visited, and in some cases it was found that the fruits were ill-shaped, slick, did not mature properly, and the vines were often subject to the ravages of rust. In nearly every case the grower had saved his own seed.

Seed saved without careful selection will produce fruit that will lack uniformity in shape, size, and quality. Careful selection of seed is based on clearly defined ideals as to type, etc. The grower who plans to select his own seed should draw up a description of the type he is attempting to produce and stick to that type, remembering that in the selected seed the special characteristics, such as early maturity, netting, sweetness, thickness of flesh, and resistance to disease, are intensified in each generation, thereby making it highly essential that seed selection should be made from the best plants only.

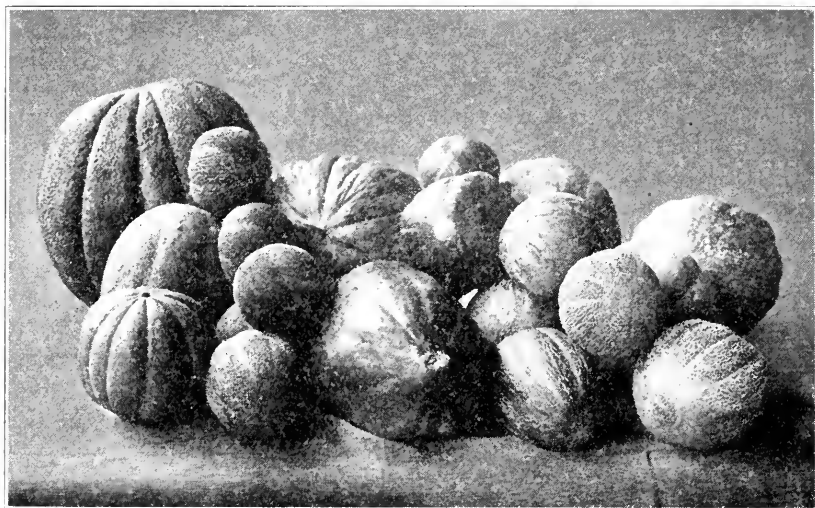


FIG. 1. Melons collected on a local market. Grown from seed SAVED, *not selected*.

The markets demand and will pay good prices only for fruit of good quality. If the grower wishes to select his own seed, and will make his selection on the following basis, he will meet the market demands, which are based on size, quality, and appearance (see Fig. 2):

1. Vine: healthy, vigorous, prolific, and early maturing.
2. Size: medium, packing 36 or 45 per crate.
3. Form: roundish.
4. Netting: well developed, grayish-brown color, completely covering the melon.
5. Rind: thin.
6. Flesh: very thick, juicy.
7. Texture: firm, fine grained, not soft.
8. Seed cavity: small, well filled, with plump seed.
9. Quality: sweet, spicy.

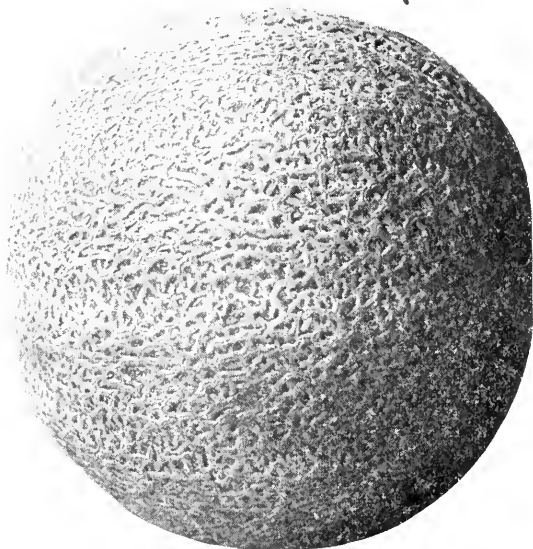


FIG. 2. Type of melon demanded by the general market.

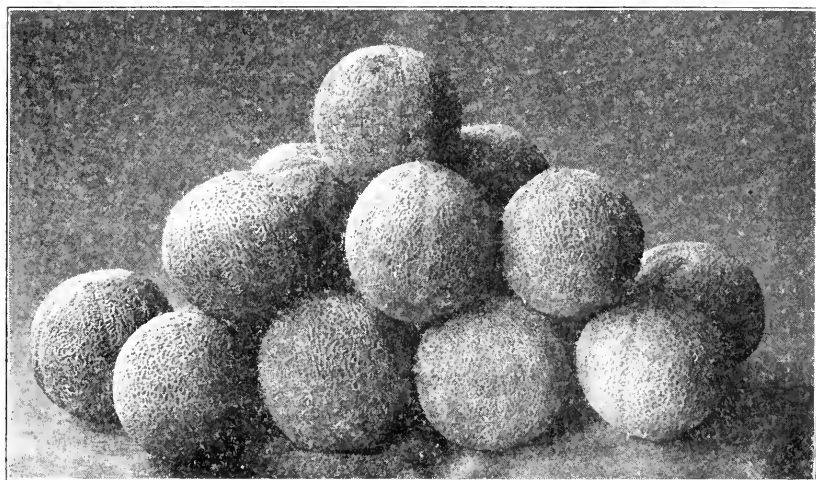


FIG. 3. Cantaloupes grown from selected seed, showing a splendid type. Compare with Fig. 1.

Where selection is made the seed from the individual plants should be sown separately and the next selection made from the resulting crop, always keeping in mind the ideal type required. In this manner a good strain will be secured. (See Fig. 3.)

There are many men who have made a specialty of raising cantaloupe seed, and who have the facilities for practicing selection, which an ordinary grower cannot have. Such men usually produce good seed, but it would be well if the grower, before purchasing seed, would inquire as to its source, and purchase only from men who are specialists in this line of seed production. There are also seed dealers, not producers, who make a practice of buying up all cull stock at the end of the season for seed purposes. These men place this undesirable seed on the market at a less price than that at which a good seed can be grown and thus place in the hands of their customers seed that cannot possibly produce a good melon.

#### PLANTING.

The best results are obtained from early planting, since the plants receive the benefit of the moisture in the soil before the usual spring drought. Early planting also has its advantages in the fact that it allows for later plantings in case something unforeseen should happen to the first plants, and at the same time it produces fruit for the early market which is generally better than the late. Many growers make several plantings at intervals of a few days and in this way make sure of a good stand. In the commercial sections the planting date varies from the middle to the end of April.

Plenty of seed should be used; about 2 pounds to the acre is required unless the season proves to be unfavorable, and then it may require from 3 to 4 pounds to make a successful planting.

The seed-bed should have been prepared as already mentioned at least two or three weeks in advance of planting. The rows are laid off 5 to 6 feet apart and the seed planted either in hills or drills. When ready to plant, the seed-bed should be lightly stirred and the seed planted to a depth of 1 inch. If planted deeper, the seed is generally slow in germinating and will produce weak plants. On the other hand, if it is planted too shallow it is very likely to dry out and germination will be entirely stopped. Good seed planted at the right depth will readily germinate.

The hill system is used by a few of the commercial growers and for home gardens. The hills are planted from 3 to 4 feet apart in the row. The drill system is the most favored by large growers, since it produces a more uniform, medium-sized melon, while the hill system produces a large-sized fruit which is not so desirable on some markets. In the drill system the seed is thickly sown and then thinned to about 2 feet in the row.

In order to hasten germination a heavy board attached to the rear of the seed drill so that it will follow the drill will be found very beneficial.

The board should be as wide as the seed-bed. It will act as a smoother and at the same time will firm the soil about the seed, which will receive the benefit of the heat and moisture in the soil thus brought in close contact with it.

#### THINNING.

Thinning should not be done until the young plants have made a good start. The best time to thin is about the time the plant has developed the first four or five leaves. Care should be used that only the strongest and most vigorous plants be left in the hill, and also that they be not disturbed. Should they be disturbed the root system may be injured, resulting in a serious check in growth, which will be detrimental to the crop, often producing inferior fruit and making it late for the market.

The thinning should be done gradually, first leaving several plants to the hill and later thinning these down to the desired number. Many growers prefer to leave two plants to the hill, but it has been found that one plant to the hill gave a larger percentage of uniform melons and a very small percentage of unmarketable fruit, while the two plants to the hill gave a goodly percentage of marketable melons, yet the percentage of culls was far in advance of the one plant to the hill.

#### CULTIVATION.

The most critical period in the development of the cantaloupe is the first two or three weeks of growth. At this stage nothing must be allowed to interfere with it, for if once set back the plant will never really recover. It will give a poor grade of fruit and will also be late. The reason that the plant needs such careful attention at this time is because of the very delicate root system. As the seed germinates it sends down a straight, long, tender, tapering root. This root later develops lateral roots which are very delicate and feed near the surface. It is upon these roots that the plant depends for its food supply, and not until they are formed will the plant put on its true leaves and begin to grow. From the foregoing the necessity of conserving the soil moisture can readily be seen.

Cultivation should begin early. The crust that forms on the surface of the seed-bed should be kept broken and a dust mulch formed in order that the young plants may have no trouble in pushing their way through the soil. At this time hoeing around the hills will do more good than at any other time during the life of the plant.

The first cultivation should be deep and near the plant, but not near enough to disturb it. The later cultivations, however, should be frequent and should become shallower at each working. This will avoid root pruning, hence a setback to the plants. The important point is to have the plants grow from start to finish without a check, and there is nothing that will help to do this so much as careful, frequent cultivation.

At the last cultivation, which should be just before the plants begin to meet in the middle of the row, cowpeas, soy beans, or clover should be sown in the middles. (See Fig. 4.) This will provide a good crop of



FIG. 4. Cowpeas sown in the middle of the row at the last cultivation.

hay, with the crab-grass that grows voluntarily in this section, and incidentally a nice profit as a second crop on the land occupied by the melons. Many growers cut from a ton to a ton and a half of hay per acre, while other growers turn the crop under to improve the land.

#### PICKING.

Picking is one of the most important operations connected with the culture of cantaloupes, chiefly because of the difficulty in securing experienced help, and the difference of opinion exhibited by most growers as to the proper stage of maturity at which a melon should be picked for market.

If picked too green, they will reach the market in good condition, but will lack quality and flavor.

If picked too ripe, they will be soft on arrival at their destination and will have to be sold at a sacrifice.

A cantaloupe if not picked at a certain stage of ripeness will never be fit to eat. Experience is required to decide what this stage is, in order that they will reach market in good condition and still possess the fine flavor and quality desired.



The longer they are to be in transportation the less mature must they be picked. Also the temperature at which they are kept while in transit must be taken into account. If they are kept cool after picking and shipped under refrigeration, they may be allowed to remain longer on the vines; consequently they will have a better flavor.

It can be readily seen, therefore, that it is very essential that they should be kept as cool as possible after picking, and not allowed to remain in the hot sun.

Melons picked in hot weather will ripen much faster than those picked in cool weather. The condition of the vine should also be taken into account. When the vine is young and vigorous ripening proceeds slowly, but as the vine gets older the fruits will ripen very rapidly. For this reason, in the early season the melons may be allowed to reach a greater stage of maturity than in the later season. If for any reason the vines should become weakened through drought, disease, or other causes, the melons must be picked at an earlier stage of maturity, because a weakened vine is almost always premature in ripening its fruit. The condition of the weather, the distance from the market, and the kind of cars used in transportation must all be taken into consideration. If the distance is great, the weather warm, and shipment to be made in ventilated cars, the fruit should be picked in an early stage of maturity. If, on the other hand, the weather be cool and refrigerator cars used, then the fruit may be picked when almost ripe. If the above conditions are all taken into consideration by the picker, there is no reason why the fruit should not reach market in good condition.

There is no set rule that can be given for picking which will apply to all conditions. The grower must exercise care and judgment with each day's picking, with the idea of getting the fruit to the market in the best possible condition. The best stage of maturity at which to pick is when the melon will slip easily from the stem. Most growers, unfortunately, have a tendency to pick their crop too green in order that the fruit will not become soft while in transportation.

The stage of maturity at which a melon is fit for picking is denoted chiefly by the color of the netting and the condition of the stem. The netting should be a grayish-brown, with the color spreading down into the rind until the whole assumes a grayish-brown cast. The underside will show a change of color which is slightly yellowish; but if this color is very pronounced, then the melon is too ripe for distant shipment. The stem will have a shriveled appearance and a slight crack will generally be in evidence at the junction of stem and fruit. Sometimes the stem will not show this crack; then if the melon shows the color already mentioned, it should be cut from the vine. Some growers make a practice of picking before any change of color is noted even on the underside of the fruit. The grower who practices this not only injures himself, but also his neighbors, since all shipments from his station will be given

a cut in price. It requires skill and practice to determine ripeness by appearance, but a skillful picker can readily determine a ripe melon. If, on the other hand, a lot of unskilled help are allowed to pick without a skilled overseer, the grower will suffer in consequence, and the results will be far from satisfactory. Consequently, one skilled man in charge of a gang of pickers is absolutely necessary.

Picking should be done every day in order that the fruit may be shipped with some degree of uniformity of ripeness. As the season advances, it will be necessary to make even two pickings a day, for then the fruit ripens very quickly.

Too much emphasis cannot be placed on the matter of handling. The fruit should be picked and handled just as carefully as possible, in order



FIG. 5. Loading freshly picked cantaloupes.

to avoid bruising. Every time a cantaloupe is bruised it softens at the bruised spot and rapidly breaks down, arriving on the market in a soft and unsalable condition. The fruit as it is picked should be placed in baskets or crates and then carried to some shaded spot as soon as possible. (See Fig. 5.) Many growers neglect to do this, but place the fruit in piles and pay little attention as to whether they are in the sun or shade. Fruit handled in this way cannot possibly arrive at its destination in a good marketable condition, no matter how carefully it may be packed. Picking in bags or sacks is a bad practice, since it adds greatly to the chances of bruising and other injuries. Enough picking receptacles should be provided to allow the fruit to stay in them until ready for grading and packing. The practice of picking into one receptacle, and placing into another for hauling to the packing shed, is a bad one,

as it increases handling. The less the fruit is handled, the better it will ship. A good rule for picking is to pick only those fruits that are in the right stage of maturity for market, handling them with care and keeping them as cool as possible.

### GRADING.

Many growers are successful in producing good melons, but fail when they begin to market them. The chief cause of this failure is the lack of proper grading. Good prices have a definite relation to certain factors, without careful consideration of which prices are not likely to be satisfactory, especially when the markets are heavily loaded. One of the chief factors is grading. Generally speaking, grading is not a common practice. The indiscriminate packing of all fruits picked, with the exception of a few culls, totally unfit for shipping, is far too common. The result of such packing is that the top market prices are not received. Grading is absolutely essential. This is demonstrated on every market. Fruits that have the same size and form have a pleasing appearance which always sells them more rapidly than fruits that lack uniformity. With certain growers who have used a proper grading system the result has been greater financial returns and a continual demand for their product. They have found that their best grades invariably bring more on the open market than ungraded fruit, and the lowest grades sell for practically the same as the ungraded fruit. This means that the extra price received for the best grade is practically all clear gain merely as a result of the slight extra labor involved in grading.

Quality is the first essential in the determination of a grade, although size and appearance must be considered.

A fancy grade must be very high in quality; the size must be normal, the shape uniform, the condition perfect, and the pack good.

The No. 1 grade must be nearly as high in quality, of good condition, but sizes a little more uneven, although the different specimens in the pack should be nearly uniform. This grade should contain melons too large or too small for the fancy grade.

The No. 2 should consist of the salable melons unfit for fancy or No. 1, but should be of fair quality and should contain no culls whatsoever.

After a little experience it is possible to grade cantaloupes on the basis of the appearance of the netting, since there is a close connection between quality and netting. A well netted, properly colored fruit is almost sure to be of high quality. The more fully developed the netting, the better the quality. The netting for fancy grade should be heavy, deep, grayish-brown in color, and completely covering the blossom end and filling out the ridges. The color should blend well with the ground

color of the rind. A melon of this kind will have the appearance of having been woven with whipcord. Well netted cantaloupes, but not so well marked as the fancy, together with melons of a size not fitted for fancy, should be graded as No. 1. Fruits with netting fairly well developed and with off sizes may be graded as No. 2. (See Fig. 6.) The amount of netting for a No. 2 is not so important as the coarseness of the netting in determining as to whether the fruit is to be graded as No. 2 or culls. In no case should slicks, cracked, overripe, or bruised fruit be shipped. They should be consigned to the cull pile.

The above grades should be maintained as long as the vines are in normal condition. As the season advances the vines lose their vigor, and for this reason it is essential that toward the end of the season more attention be given to grading. It will become necessary to eliminate the fancy grade or make it a No. 1, and No. 1 a No. 2. In order that the grades of fruits be held up to standard quality, the grower should from time to time test a few melons from each grade. In this way trouble as to quality will be avoided. On the market the outward appearance of a cantaloupe is the only means by which the quality is to be judged. In order to protect the buyer and maintain his own reputation, the grower should not fail to make a test every few days.

#### THE PACKING SHED.

The chief essentials of a good packing shed are plenty of shade, light, and a good circulation of air. To have these it must have a good roof and one that overlaps the sides of the shed considerably. The sides should be open (see Fig. 7), but may be boarded in order to give shade. It may be either a temporary or permanent structure. However, the temporary structure serves the purpose of the average grower, since it may be put up on or near the cantaloupe field. The ideal packing shed is one with a wide overlapping roof and with the sides open, but provided with curtains, which may be moved as desired to give protection to the fruit from either sunshine or storm. The interior should be roomy, allowing for shelter for the fruit as it is brought from the field, and also for the storage of the packed crates until they are carried to the shipping point. The size of the packing shed is determined by the size of the crop and the number of persons employed in packing. The shed should be placed as near the field as possible in order to prevent a long haul. The placing of it near the farm buildings has advantages, but, generally speaking, if placed near the field the grower is enabled to keep in closer touch with his pickers and packers.

The interior of the shed should be provided, on two sides, with a packers' bench. The advantage of this is that the teams can unload from the outside directly upon the benches and thereby save undue crowd-

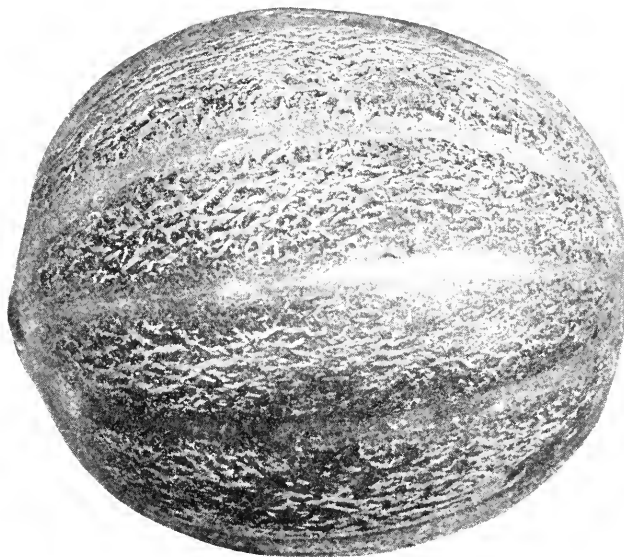


FIG. 6. A No. 2 grade cantaloupe.



FIG. 7. A typical packing shed.

ing and interference with the work of the packers. The packers' bench should be made about 5 feet wide and about 6 or 8 inches deep, with a slight slope toward the inside of the shed. It should be divided at regular intervals of 3 or 4 feet, forming bins which will facilitate both grading and packing. Pieces of board should be attached so that they project about the width of a crate, thus forming a support for the crates while they are being packed.

The packer works on the inside (see Fig. 7), and grades as he packs. In some of the sheds the crates are placed directly on the table. When this is done the packer is handicapped, and cannot work as fast as when the crate is placed on a support. A good temporary crate support can be made by using two standard crates, placing one on the ground and the other on top of it at an angle of about 30°. The two crates are then fastened together by two slats on each side. This arrangement makes a very desirable support, and is easily moved from place to place, allowing the packer to move along the table as necessity demands.

#### PACKING.

While grading is one of the essential factors having a distinct relation to good prices, packing is also one of the important items in the successful marketing of cantaloupes. A clean package which is neat and attractive, bearing a distinctive label, will always be given preference over a package which is unsightly. A good package helps to sell the fruit. The full benefit from careful grading can never be received if careless methods of packing predominate. Fruit should be so placed that it will fit snugly in the package without being forced and bruised while being placed by the packer. The style of package called for by the markets served by this State is the slatted crate made in two sizes, namely, the standard crate, measuring 12 x 12 x 22 inches, and the "pony" crate, measuring 11 x 11 x 22 inches. The standard crate is used chiefly for what is known as the standard size melon, which packs 45 to the crate, but is also used for the Jumbo size, which packs 36 to a crate. The pony crate is used for the pony size cantaloupes, which pack 54 to a crate. Occasionally a grower may have many odd-size melons, and then variations in the pack must be made according to size. In such cases the cantaloupes are then packed 19, 27, and 32 in a standard crate and 64 in a pony crate. However, this is rarely done, as it is poor practice to send melons of such odd sizes to the market. (See Fig. 8.) Preference is always given to the Jumbo size, packing 36, and the standard, packing 45 fruits to a crate.

Care should be used in placing the cantaloupes all one way in the package. (See Fig. 9.) If they are ridged, they should be placed so that the ridges are all parallel with the sides of the crate. If the melons are

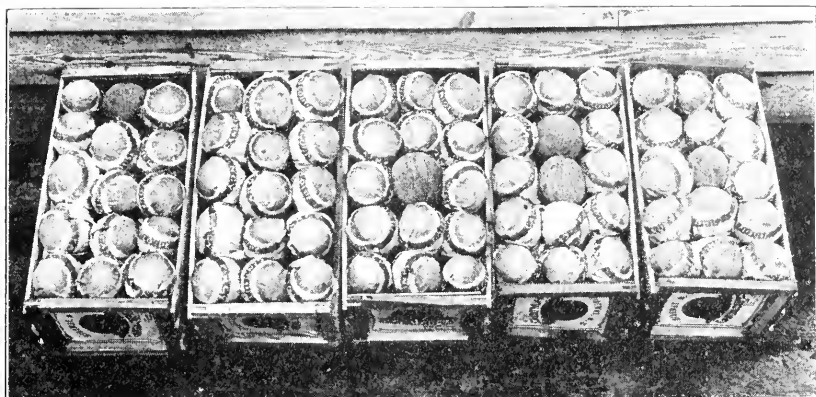


FIG. 8. Ideal packing.



FIG. 9. Badly packed odd-sized cantaloupes.

oval instead of round, they should be placed so that they are longways in the crate, with the most attractive side appearing uppermost, so as to show to the best advantage in the package.

Ideal packing (see Fig. 10) is secured only when the fruit fits snugly and will stay where placed by the packer. It must not be forced into



FIG. 10. Method of packing oval type of cantaloupes.

position. The fruit should extend slightly above the edge of the crate, so that when the slats are nailed on they will hold the fruit firmly in place and thus prevent the pack from becoming loose while in transit. Neatness should be characteristic both of the crate and of the arrangement of its contents. An attractive label bearing the grower's name, brand, and the grade, should be placed on each end of the crate.

#### DIRECTIONS TO SHIPPERS.

1. Carefully superintend the pickings.
2. Do not pick green cantaloupes. Green cantaloupes arrive on the market in firm condition, but will lack quality.
3. Remove cantaloupes to shade as soon as picked and keep fruit as cool as possible. Fruit that has been kept in the sun and dust will ripen rapidly and will soon become unfit for market.
4. Handle as little as possible and with care. Cantaloupes handled frequently are very liable to become bruised. A bruised cantaloupe is insipid and will soon break down.
5. Ship only sound stock.
6. Grade and pack carefully.



7. Establish grades and strictly maintain them. Produce dealers will then rely on your shipments.

8. Use only clean, strong crates.

9. Label crates.

10. Protect fruit from sun, rain, and dust by using a cover while en route to shipping point.

11. Do not deliver cantaloupes to the railroad until just before train time.

## LEAF TOBACCO REPORT FOR JUNE, 1915.

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Pounds sold for producers.....	25,825
Pounds sold for dealers.....	58,202
Pounds sold for warehouses.....	5,956
Total.....	89,983

**THE BULLETIN**  
**OF THE**  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE**  
**RALEIGH**

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Vol. 36, No. 9

SEPTEMBER, 1915

Whole No. 212

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**REPORT OF SEED TESTS FOR 1915**

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of March 6, 1900.

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EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS

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\*Assigned by the Bureau of Soils, United States Department of Agriculture.

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‡In cooperation with Bureau of Plant Industry, United States Department of Agriculture.

## LETTER OF TRANSMITTAL

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RALEIGH, August 1, 1915.

HON. W. A. GRAHAM,  
*Commissioner of Agriculture,  
Raleigh, N. C.*

SIR:—I have the honor to submit herewith the report on the recleaning, analysis, and germination of the agricultural and vegetable seed samples collected and analyzed in accordance with the North Carolina Pure Seed Act; also, samples submitted by interested individuals, from July 15, 1914, to July 15, 1915, and recommend its publication as the September BULLETIN of the Division of Agronomy and Botany of this Department.

Respectfully submitted,

J. L. BURGESS,  
*Agronomist and Botanist.*

Approved for printing:

W. A. GRAHAM,  
*Commissioner of Agriculture.*

# REPORT OF THE DIVISION OF AGRONOMY AND BOTANY FOR 1915

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BY JAMES L. BURGESS.

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## GENERAL REMARKS.

According to the provisions of the North Carolina Pure Seed Act, seed samples have been collected and analyzed since the act went into effect, July 1, 1909. The present publication is the fifth report of seed tests made by this department, and includes all samples received from July 15, 1914 to July 15, 1915. During that time 1,475 samples in all have been tested; total agricultural seed samples 1,011, samples from inspectors 746, samples from individuals 284. Total samples for purity was 964; total samples for germination was 511. Germination tests were made of 445 samples of vegetable seeds. Also 185 samples of tobacco seed were received and cleaned for farmers of the State as against 123 samples received in 1914.

It is interesting to note the gradually increasing interest the individual farmer is taking in the use of better seeds. The degree of his interest may be seen from the number of seed samples he sends from year to year to the Seed Laboratory for examination. During 1913 the individual farmer sent, on his own initiative, 136 samples of seeds for examination; during 1914, 228 samples and during the year ending July 15, 1915 284 samples.

The total number of agricultural seeds shows a material increase over the number received during 1913 and 1914. The number of vegetable seeds fell off during 1915, but still show more than 100 per cent increase over 1913.

The coming on of the European war seemed to give some few seedsmen an excuse for dumping on the market large quantities of inferior or dead seeds during the fall of 1914. As a result of this want of precaution, on the part of both the seedsmen and the farmers, much seed of low vitality came to the laboratory. This was especially true of the crimson clover seed, which showed a germination of an average of 10 per cent lower than that found in similar seeds sold the previous year.

Tables No. 1 and 2 show the comparative number of seed samples received at the laboratory during the years 1913, 1914 and 1915. The large showing made in the number of vegetable seeds during 1914 was due to a special effort made in the collection of these seeds during this year, and also to the fact that several samples of vegetable seeds were carried over from 1913, due to a change in the date of issue of the annual bulletin from this division.

TABLE No. 1.

TOTAL NUMBER OF SAMPLES OF AGRICULTURAL SEEDS RECEIVED.

Name	1913	1914	1915
Alfalfa.....	10	28	22
Barley.....	3	3	1
Beans, Soja.....	1	4	5
Beans, Velvet.....	8	1	1
Blue Grass, Kentucky.....	19	34	43
Cane.....	0	0	9
Chufas.....	2	2	0
Clover, Alsike.....	2	12	9
Clover, Bur.....	1	1	3
Clover, Crimson.....	66	131	169
Clover, Japan.....	0	0	3
Clover, Red.....	51	98	142
Clover, Sweet.....	1	3	3
Clover, white.....	0	0	7
Corn, Field.....	73	28	47
Cowpeas.....	14	1	3
Fescue, Meadow.....	1	2	1
Grass, Billion Dollar.....	0	0	1
Grass, Italian Rye.....	1	7	5
Grass, Orchard.....	9	51	54
Grass, Tall Meadow Oat.....	2	14	23
Grass, Sudan.....	0	0	12
Lawn Grass.....	0	0	3
Millet, German.....	12	14	8
Millet, Pearl.....	11	6	7
Oats.....	142	233	208
Peas, Canada Field.....	2	2	1
Rape.....	9	49	59
Redtop.....	8	37	27
Rye.....	53	64	43
Timothy.....	12	33	43
Vetch, Winter.....	6	41	36
Wheat.....	6	26	13
Total.....	525	955	1,011

TABLE No. 2.  
TOTAL NUMBER OF SAMPLES OF VEGETABLE SEEDS RECEIVED.

Wholesale Dealer	1913	1914	1915
American Seed Co., Detroit, Mich.....	0	0	8
W. W. Barnard Co., Chicago, Ill.....	3	9	3
J. Bolgiano & Sons, Baltimore, Md.....	3	2	2
Robert Buist Co., Philadelphia, Pa.....	14	63	47
Everett B. Clark Seed Co., Milford, Conn.....	0	0	2
Crosman Bros. Co., Rochester, N. Y.....	27	113	10
Diggs & Beadles, Richmond, Va.....	1	5	2
D. M. Ferry & Co., Detroit, Mich.....	64	233	92
Girardeau Seed Co., Monticello, Fla.....	0	0	1
Lake Shore Seed Co., Dunkirk, N. Y.....	30	95	25
D. Landreth Seed Co., Bristol, Pa.....	18	54	47
Leonard Seed Co., Chicago, Ill.....	2	27	27
L. L. May & Co., St. Paul, Minn.....	7	18	0
George R. Pedrick & Son., Pedricktown, N. Y.....	0	0	1
J. B. Rice Seed Co., Cambridge, N. Y.....	10	73	38
Rockford Seed Co., Rockford, Ill.....	0	0	1
Slate Seed Co., South Boston, Va.....	0	0	10
Wood, Stubbs & Co., Louisville, Ky.....	0	0	30
T. W. Wood & Sons, Richmond, Va.....	14	84	94
Dealer not given.....	0	0	5
Total.....	203	818	445



SEED SHOULD BE TESTED AND THE VALUE KNOWN BEFORE PURCHASING.

The wisdom of having seed tested and of knowing the actual cost and value of the seed to be planted may be illustrated by the following data. These samples were tested in the laboratory, and are fairly typical of the different grades of seed offered on the market at the same price.

TABLE No. 3.

Laboratory Number	Kind of Seed	Retail Price	Actual Cost	Actual Value
1388.....	Crimson Clover.....	\$0.15 per pound....	\$0.16 per pound....	95 per cent.
2232.....	Crimson Clover.....	.15 per pound....	1.30 per pound....	11 per cent.
1427.....	Red Clover..... (No Dodder.)	.20 per pound....	.21 per pound....	96 per cent.
1409.....	Red Clover..... (Dodder Present.)	.20 per pound....	.30 per pound....	48 per cent.
2108.....	Orchard Grass.....	.20 per pound....	.22 per pound....	73 per cent.
2024.....	Orchard Grass.....	.20 per pound....	.56 per pound....	25 per cent.
1534.....	Redtop.....	.20 per pound....	.22 per pound....	87 per cent.
2157.....	Redtop.....	.20 per pound....	.32 per pound....	37 per cent.

## WEED SEEDS.

The three kinds of weed seeds of most frequent occurrence in the principal kinds of agricultural seeds tested are given below, the one found most frequently being listed first:

*Alfalfa*—Buckhorn, Green Foxtail, Lamb's Quarters.

*Bluegrass, Kentucky*—Field Sorrel, Buckhorn, Large Mouse-ear Chickweed.

*Clover, Crimson*—Black or Hop Medic, Wild Mustard, Slender Foxtail.

*Clover, Red*—Buckhorn, Curled Dock, Green Foxtail.

*Clover, White*—Field Sorrel, Black or Hop Medic, Large Mouse-ear Chickweed.

*Grass, Orchard*—Field Sorrel, Buckhorn, Cheat.

*Oats*—Cheat, Corn Cockle, Darnel.

*Redtop*—Yarrow, Rugel's Plantain, Woolly Panicum.

Out of 51 samples of Red Clover seed tested, Dodder was found to occur in 21 samples, and in no samples of Alfalfa out of 8 samples tested.

According to section 5 of the North Carolina Seed Act, the occurrence of the following weed seeds in agricultural seeds to be used for planting is considered unlawful: Wild Onion or Garlic (*Allium vineale* L. and *A. Canadense* L.), Wild Mustard (*Brassica arvensis* (L.) Ktz.), Couch-grass (*Agropyron repens* (L.) Beauv.), Canada Thistle (*Carduus arvensis* (L.) Robs.), Wild Oat (*Avena fatua* L.), Clover Dodder (*Cuscuta Epithymum* Murr), Corn Cockle (*Agrostemma Githago* (L.), Cheat (*Bromus secalinus* L.), Dog Fennel (*Eupatorium capillifolium* (Lam.) Small.), Wild Carrot (*Daucus Carota* L.)

TABLE No. 4.

SHOWING THE FIFTY WEED SEEDS OF MOST COMMON OCCURRENCE,  
FOUND IN ALL OF THE SAMPLES TESTED FOR PURITY.

(961 Samples Examined.)

	Scientific Name	Common Name	Found in
1	<i>Rumex acetosella</i> .....	Field Sorrel.....	213 samples
2	<i>Medicago lupulina</i> .....	Black Medic.....	197 samples
3	<i>Rumex crispus</i> .....	Curled Dock.....	195 samples
4	<i>Plantago lanceolata</i> .....	Buckhorn.....	167 samples
5	<i>Alopecurus agrestis</i> .....	Slender Foxtail.....	130 samples
6	<i>Plantago Rugelii</i> .....	Rugel's Plantain.....	123 samples
7	<i>Chaetochloa viridis</i> .....	Green Foxtail.....	110 samples
8	<i>Lychnis alba</i> .....	White Champion.....	110 samples
9	<i>Bromus secalinus</i> .....	Chess.....	86 samples
10	<i>Geranium dissectum</i> .....	Cut-leaved Cranesbill.....	82 samples
11	<i>Chenopodium album</i> .....	Lamb's Quarters.....	76 samples
12	<i>Agrostemma Githago</i> .....	Corn Cockle.....	65 samples
13	<i>Sherardia arvensis</i> .....	Blue Field-madder.....	64 samples
14	<i>Potentilla Monspelienis</i> .....	Rough Cinquefoil.....	50 samples
15	<i>Cerastium vulgatum</i> .....	Larger Mouse-ear Chickweed.....	58 samples
16	<i>Bromus hordeaceus</i> .....	Soft Chess.....	53 samples
17	<i>Daucus carota</i> .....	Wild Carrot.....	51 samples
18	<i>Carex spp.</i> .....	Sedges.....	48 samples
19	<i>Chaetochloa glauca</i> .....	Yellow Foxtail.....	46 samples
20	<i>Lepidium apetalum</i> .....	Peppergrass.....	46 samples
21	<i>Galium Aparine</i> .....	Cleavers.....	43 samples
22	<i>Achillea Millefolium</i> .....	Yarrow.....	41 samples
23	<i>Ambrosia artemisiæfolia</i> .....	Ragweed.....	40 samples
24	<i>Vicia hirsuta</i> .....	Hairy Tare.....	38 samples
25	<i>Bursa Bursa-pastoris</i> .....	Shepherd's Purse.....	35 samples
26	<i>Anthyllis Vulneraria</i> .....	Kidney Vetch.....	32 samples
27	<i>Prunella vulgaris</i> .....	Heal-all.....	32 samples
28	<i>Vicia angustifolia</i> .....	Tare.....	29 samples
29	<i>Ranunculus sp.</i> .....	Crowfoot.....	27 samples
30	<i>Juncus spp.</i> .....	Rushes.....	27 samples
31	<i>Holcus lanatus</i> .....	Velvet Grass.....	26 samples
32	<i>Lolium temulentum</i> .....	Darnel.....	26 samples
33	<i>Melilotus Alba</i> .....	White Sweet Clover.....	25 samples
34	<i>Vicia sativa</i> .....	Spring Vetch.....	24 samples
35	<i>Geranium molle</i> .....	Dove's-foot Cranesbill.....	22 samples
36	<i>Carex cephalophora</i> .....	Oval-headed Sedge.....	20 samples

TABLE NO. 4—CONTINUED.

	Scientific Name	Common Name	Found in
37	<i>Polygonum Convolvulus</i> .....	Black Bindweed.....	20 samples
38	<i>Centaurea</i> sp.....	Centaurea.....	20 samples
39	<i>Polygonum persicaria</i> .....	Lady's-thumb.....	19 samples
40	<i>Veronica avensis</i> .....	Corn Speedwell.....	19 samples
41	<i>Echinochloa crus-galli</i> .....	Barnyard Grass.....	18 samples
42	<i>Anthemis cotula</i> .....	Mayweed.....	18 samples
43	<i>Rudbeckia hirta</i> .....	Black-eyed Susan.....	18 samples
44	<i>Eleocharis</i> sp.....	Spike Rush.....	18 samples
45	<i>Syntherisma linearis</i> .....	Small Crab-grass.....	17 samples
46	<i>Geranium pusillum</i> .....	Small-flowered Cranesbill.....	17 samples
47	<i>Allium vineale</i> .....	Wild Garlic.....	16 samples
48	<i>Onagra biennis</i> .....	Evening Primrose.....	16 samples
49	<i>Festuea myuros</i> .....	Rat's-tail Fescue Grass.....	16 samples
50	<i>Barbarea praecox</i> .....	Early Winter Cress.....	16 samples

## CLEANING TOBACCO SEED.

Three years ago this division began a new line of work, that of cleaning tobacco seed for farmers of the State. Most gratifying reports have been received from persons for whom seed was cleaned. The following shows the trend of opinion among the tobacco farmers in regard to this new line of work:

"The tobacco seed I had cleaned by the Department of Agriculture last year I gave to one hundred and twenty-five farmers, and find them all pleased with the seed. I want to say that I find a great difference in the results where seeds are cleaned.

"First. I get stronger plants on beds, and have no small, inferior plants.

"Second. The tobacco lives better; not having to replant, grows evenly, not having any late, inferior tobacco to contend with.

"Third. It matures uniformly, making the housing of the crop easier.

"Fourth. I get a better grade of tobacco, heavier and more uniform.

"Fifth. Better plants, regular growth, uniform maturity, heavier crops, and better prices I find to be the result of cleaned seed, with which I am much pleased. I am sending you today my seed for this year to be cleaned."

From a very small beginning this work has grown till during the past year we recleaned and returned to the tobacco farmers enough seed to plant many thousand acres of tobacco. The farmers are thus appreciating the importance of clean seed for the tobacco crop as well as for other crops.

The planting of clean seed of high vitality is of such importance that it is hoped the tobacco farmers of the State will take advantage of the opportunity the department offers and have all of their seed cleaned. This work can be done more efficiently by the department than by the farmers, as the Seed Laboratory has special apparatus for doing this work. Several times the quantity of seed desired for sowing should be sent to insure a sufficient quantity of cleaned seed. The seed should be

sent some time before it is wanted. The department makes no charge for cleaning tobacco seed.

### HOW TO SEND SEED SAMPLES FOR TESTING.

Of the smaller seed, such as the grasses and clovers, about three or four tablespoonfuls is a sufficient amount to send for testing. Of the larger seeds, as corn and oats, about a cupful is necessary. The following information should accompany all samples: Name and address of wholesale and retail dealer, retail price, and name and address of sender. Samples should be securely wrapped and addressed to

THE NORTH CAROLINA SEED LABORATORY,  
DEPARTMENT OF AGRICULTURE,  
RALEIGH, N. C.

TABLE No. 5.

### TOBACCO SEEDS RECLEANED FOR THE FARMERS OF THE STATE.

Laboratory Number	Name and Address of Sender	Amount of Recleaned Seed Returned
5238	C. G. Adams, R. F. D. No. 2, Pilot Mountain, N. C.....	90 c. c.
5263	C. G. Adams, R. F. D. No. 2, Pilot Mountain, N. C.....	40 c. c.
5311	Sim Adams, R. F. D. No. 4, Durham, N. C.....	90 c. c.
5212	Fred Alphin, Mt. Olive, N. C.....	255 c. c.
5278	J. F. Anderson, Cedar Grove, N. C.....	290 c. c.
5293	E. S. Angel, R. F. D. No. 2, Siloam, N. C.....	105 c. c.
5331	J. B. Atwater, Chapel Hill, N. C.....	360 c. c.
5387	J. F. Barker, R. F. D. No. 2, Altamahaw, N. C.....	155 c. c.
5327	G. M. Beavers, R. F. D. No. 1, Apex, N. C.....	165 c. c.
5294	O. B. Beeson, Kernersville, N. C.....	300 c. c.
5267	John Bennett, R. F. D. No. 1, Rural Hall, N. C.....	115 c. c.
5217	B. L. Blackwell, R. F. D. No. 2, Pelham, N. C.....	166 c. c.
5305	W. B. Blair, R. F. D. No. 2, Pilot Mountain, N. C.....	45 c. c.
5225	W. R. Blalock, R. F. D. No. 1, Roxboro, N. C.....	615 c. c.
5296	John W. Blanchard, R. F. D. No. 8, Burlington, N. C.....	205 c. c.
5229	Fletcher Bobbitt, R. F. D. No. 1, Warren Plains, N. C.....	170 c. c.
5284	Nick B. Boddie, Nashville, N. C.....	850 c. c.
5287	Nick B. Boddie, Nashville, N. C.....	115 c. c.
5325	J. A. Boone, Franklinton, N. C.....	690 c. c.
5371	J. A. Boone, Franklinton, N. C.....	545 c. c.
5260	F. W. Boswell, R. F. D. No. 3, Wilson, N. C.....	48 c. c.
5228	J. A. Brake, Rocky Mount, N. C.....	165 c. c.
5343	W. T. Braswell, R. F. D. No. 4, Nashville, N. C.....	115 c. c.
5357	J. B. Britt, R. F. D. No. 1, McCullers, N. C.....	142 c. c.
5326	Z. B. Britt, Garner, N. C.....	300 c. c.
5376	A. C. Broughton, Knightdale, N. C.....	250 c. c.

TABLE NO. 5—CONTINUED.

Laboratory Number	Name and Address of Sender	Amount of Recleaned Seed Returned
5341	V. L. Bryan, Durham, N. C.....	120 e. e.
5259	A. H. Bryant, R. F. D. No. 1, Jonesville, N. C.....	130 e. e.
5390	J. W. Butler, R. F. D. No. 2, Reidsville, N. C.....	330 e. e.
5351	J. C. Byrd, R. F. D. No. 1, Jonesville, N. C.....	90 e. e.
5300	W. J. Cantrell, R. F. D. No. 2, Burlington, N. C.....	330 e. e.
5288	Elias Carr, Raleigh, N. C.....	590 e. e.
5250	T. A. Cates, Stagville, N. C.....	215 e. e.
5356	W. H. Chablee, R. F. D. No. 2, Zebulon, N. C.....	292 e. e.
5358	W. H. Chablee, R. F. D. No. 2, Zebulon, N. C.....	220 e. e.
5321	J. W. Chandler, Ruffin, N. C.....	288 e. e.
5313	W. H. Chandler, R. F. D. No. 1, Crutchfield, N. C.....	85 e. e.
5218	J. A. Clifton, Gorman, N. C.....	360 e. e.
5256	Frank Collins, R. F. D. No. 1, Francisco, N. C.....	255 e. e.
5373	A. A. Compton, Cedar Grove, N. C.....	130 e. e.
5230	J. E. Crute, Wilson, N. C.....	524 e. e.
5392	D. S. Currie, Raeford, N. C.....	163 e. e.
5323	A. P. Daniel, Hurdle Mills, N. C.....	125 e. e.
5346	Elgon J. Davis, R. F. D. No. 2, Boonville, N. C.....	25 e. e.
5286	J. M. Davis, Boonville, N. C.....	50 e. e.
5310	D. H. Dickie, R. F. D. No. 1, Henderson, N. C.....	100 e. e.
5243	J. R. Dozier, Fountain, N. C.....	120 e. e.
5280	E. A. Ebert, R. F. D. No. 1, Tobaccoville, N. C.....	45 e. e.
5349	C. C. Edwards, R. F. D. No. 3, Durham, N. C.....	110 e. e.
5329	C. L. Essick, R. F. D. No. 2, Pinnacle, N. C.....	140 e. e.
5381	W. V. Ferrell, Knightdale, N. C.....	115 e. e.
5355	J. W. Finch, R. F. D. No. 2, Henderson, N. C.....	350 e. e.
5362	Edwin Fleming, Middleburg, N. C.....	335 e. e.
5334	W. E. Foster, R. F. D. No. 6, Oxford, N. C.....	96 e. e.
5240	Jae Francis, Francisco, N. C.....	130 e. e.
5297	N. J. Fulk, R. F. D. No. 3, Pilot Mountain, N. C.....	220 e. e.
5369	W. D. Fuller, Louisburg, N. C.....	140 e. e.
5301	J. E. Furguson, R. F. D. No. 7, Raleigh, N. C.....	110 e. e.
5270	J. M. Glasco, R. F. D. No. 5, Winston-Salem, N. C.....	180 e. e.
5239	Clarence Glenn, R. F. D. No. 4, Durham, N. C.....	110 e. e.
5222	Geo. E. Glenn, R. F. D. No. 4, Durham, N. C.....	120 e. e.
5265	H. W. Gordon, Pilot Mountain, N. C.....	150 e. e.
5314	S. M. Gordon, Pinnacle, N. C.....	125 e. e.
5372	Pink Graves, R. F. D. No. 1, Union Ridge, N. C.....	95 e. e.
5261	James Gunn, R. F. D. No. 1, Wentworth, N. C.....	165 e. e.
5249	R. N. Gupton, Gupton, N. C.....	230 e. e.

TABLE 5—CONTINUED.

Laboratory Number	Name and Address of Sender	Amount of Recleaned Seed Returned
5340	Aaron Hall, R. F. D. No. 2, Knightdale, N. C.....	390 e. e.
5307	C. A. Hall, R. F. D. No. 2, Sifoam, N. C.....	165 e. e.
5339	S. S. Hall, R. F. D. No. 2, Knightdale, N. C.....	260 e. e.
5391	Willie Hall, R. F. D. No. 2, Knightdale, N. C.....	115 e. e.
5336	H. L. Hamilton, Willow Springs, N. C.....	170 e. e.
5242	J. W. Hampton, Clemmons, N. C.....	85 e. e.
5245	H. B. Harris, R. F. D. No. 1, Cardenas, N. C.....	205 e. e.
5252	O. P. Harris, R. F. D. No. 1, Cardenas, N. C.....	60 e. e.
5266	W. T. Hawkins, Hurdle Mills, N. C.....	235 e. e.
5345	W. A. Hinton, Apex, N. C.....	155 e. e.
5247	John T. Hittor, R. F. D. No. 2, Thomasville, N. C.....	130 e. e.
5281	J. H. Hobson, R. F. D. No. 3, Yadkinville, N. C.....	140 e. e.
5338	S. M. Hodges, R. F. D. No. 5, Danville, Va.....	235 e. e.
5388	D. R. Hopkins, Brown Summit, N. C.....	138 e. e.
5347	D. W. Horton, R. F. D. No. 1, Chapel Hill, N. C.....	135 e. e.
5234	I. N. Hunt, Pinnacle, N. C.....	280 e. e.
5251	Monroe Hunter, R. F. D. No. 1, Pilot Mountain, N. C.....	60 e. e.
5354	J. Lee Hurdle, Union Ridge, N. C.....	310 e. e.
5262	J. L. Jackson, R. F. D. No. 4, Mt. Airy, N. C.....	85 e. e.
5379	A. J. Jeffries, R. F. D. No. 3, Mebane, N. C.....	190 e. e.
5210	Hugh Jeffries, R. F. D. No. 5, Burlington, N. C.....	100 e. e.
5393	J. W. Jeffries, R. F. D. No. 3, Mebane, N. C.....	90 e. e.
5316	E. S. Jenkins, R. F. D. No. 3, Macon, N. C.....	75 e. e.
5211	T. A. Jernigan, Mount Olive, N. C.....	140 e. e.
5291	J. E. Jessup, Westfield, N. C.....	190 e. e.
5285	O. W. Johns, Wilson, N. C.....	725 e. e.
5342	J. O. Jones, R. F. D. No. 1, Chapel Hill, N. C.....	205 e. e.
5365	J. F. King, Burlington, N. C.....	125 e. e.
5394	W. H. Lasater, R. F. D. No. 4, Apex, N. C.....	145 e. e.
5360	E. B. Lassiter, R. F. D. No. 1, Holly Springs, N. C.....	315 e. e.
5386	C. L. Laster, R. F. D. No. 4, Apex, N. C.....	190 e. e.
5364	S. T. Lemay, R. F. D. No. 5, Henderson, N. C.....	245 e. e.
5352	W. L. Lineberry, R. F. D. No. 1, Mebane, N. C.....	140 e. e.
5348	B. D. Linville, R. F. D. No. 1, Tobaccoville, N. C.....	25 e. e.
5253	J. F. Livengood, R. F. D. No. 3, Mt. Airy, N. C.....	50 e. e.
5366	M. M. Loggins, R. F. D. No. 1, Pinnacle, N. C.....	75 e. e.
5248	R. L. Lovell, R. F. D. No. 2, Pilot Mountain, N. C.....	40 e. e.
5312	D. E. McKaughan, R. F. D. No. 1, Kernersville, N. C.....	205 e. e.
5271	L. D. McKinney, R. F. D. No. 1, Lillington, N. C.....	250 e. e.
5235	Thos. S. Malloy, Reidsville, N. C.....	460 e. e.

TABLE 5—CONTINUED

Laboratory Number	Name and Address of Sender	Amount of Recleaned Seed Returned
5319	R. V. Marshall, Westfield, N. C.....	175 e. e.
5257	Jas. D. Martin, Smith, N. C.....	60 e. e.
5258	J. J. Martin, Jonesville, N. C.....	135 e. e.
5273	T. M. Martin, Sandy Ridge, N. C.....	115 e. e.
5220	B. C. Matthews, R. F. D. No. 2, Holly Springs, N. C.....	58 e. e.
5237	J. D. Matthews, R. F. D. No. 2, Siloam, N. C.....	90 e. e.
5223	R. L. Matthews, R. F. D. No. 2, Siloam, N. C.....	120 e. e.
5353	T. S. Matthews, R. F. D. No. 3, Raleigh, N. C.....	230 e. e.
5304	Geo. H. Maurice, Eagle Springs, N. C.....	255 e. e.
5318	J. V. Mitchell, Stoneville, N. C.....	715 e. e.
5232	Ira M. Moore, Stokes, N. C.....	450 e. e.
5320	W. A. Moore, R. F. D. No. 8, Burlington, N. C.....	115 e. e.
5255	Willie Neal, Gupton, N. C.....	320 e. e.
5214	A. D. Norris, Holly Springs, N. C.....	260 e. e.
5375	Jasper Oakley, Wakefield, N. C.....	50 e. e.
5283	C. E. Overton, R. F. D. No. 6, Oxford, N. C.....	130 e. e.
5241	J. C. Parker, Fountain, N. C.....	760 e. e.
5275	J. C. Parker, Fountain, N. C.....	350 e. e.
5227	W. C. Paris, R. F. D. No. 2, Belew Creek, N. C.....	40 e. e.
5335	J. W. Pearce, Willow Springs, N. C.....	160 e. e.
5309	A. A. Pegg, Kernersville, N. C.....	255 e. e.
5298	L. P. Pell, R. F. D. No. 2, Pilot Mountain, N. C.....	300 e. e.
5361	Alfred Plummer, Middleburg, N. C.....	215 e. e.
5277	S. B. Poe, R. F. D. No. 3, Apex, N. C.....	745 e. e.
5224	J. H. Pritchett, Forshee, N. C.....	510 e. e.
5359	W. C. Pulley, R. F. D. No. 1, Knightdale, N. C.....	440 e. e.
5274	Charlie Randleman, R. F. D. No. 1, Pinnacle, N. C.....	310 e. e.
5302	W. P. Ray, R. F. D. No. 1, Smith, N. C.....	305 e. e.
5244	N. A. Renegar, R. F. D. No. 1, Houstonville, N. C.....	110 e. e.
5374	B. B. Richards, Wakefield, N. C.....	115 e. e.
5282	J. M. Ring, R. F. D. No. 2, Thomasville, N. C.....	155 e. e.
5370	F. W. Risher, R. F. D. No. 3, Durham, N. C.....	125 e. e.
5389	F. W. Risher, R. F. D. No. 3, Durham, N. C.....	42 e. e.
5363	W. P. Robertson, Wakefield, N. C.....	100 e. e.
5367	W. L. Rolland, R. F. D. No. 1, McCullers, N. C.....	280 e. e.
5221	J. D. Ross, R. F. D. No. 6, Durham, N. C.....	290 e. e.
5322	S. M. Rowland, R. F. D. No. 3, Raleigh, N. C.....	425 e. e.
5380	R. H. Russell, R. F. D. No. 5, Roxboro, N. C.....	47 e. e.
5350	J. W. Sanders, R. F. D. No. 4, Nashville, N. C.....	110 e. e.
5268	L. H. Sanderson, R. F. D. No. 1, Hallsville, N. C.....	230 e. e.

TABLE 5—CONTINUED.

Laboratory Number	Name and Address of Sender	Amount of Recleaned Seed Returned
5337	J. B. Sauls, R. F. D. No. 1, Garner, N. C.....	370 c. e.
5295	Lee Sauls, R. F. D. No. 8, Burlington, N. C.....	220 c. e.
5292	R. A. Sauls, R. F. D. No. 1, Garner, N. C.....	380 c. e.
5236	John Scott, R. F. D. No. 2, Reidsville, N. C.....	314 c. e.
5308	W. B. Sellars, R. F. D. No. 3, Mebane, N. C.....	320 c. e.
5254	C. F. Shields, R. F. D. No. 1, Kernersville, N. C.....	130 c. e.
5264	J. P. Simmons, R. F. D. No. 1, Mt. Airy, N. C.....	55 c. e.
5289	Riley Simmons, R. F. D. No. 1, White Plains, N. C.....	40 c. e.
5358	J. Lee Simpson, R. F. D. No. 3, Kernersville, N. C.....	35 c. e.
5279	John T. Singletary, R. F. D. No. 3, Lumberton, N. C.....	1,920 c. e.
5303	J. W. Slade, R. F. D. No. 1, Blanch, N. C.....	195 c. e.
5328	John R. Smith, Westfield, N. C.....	35 c. e.
5276	N. H. Smith, R. F. D. No. 4, Kernersville, N. C.....	215 c. e.
5315	Thos. H. Smothers, R. F. D. No. 2, Reidsville, N. C.....	395 c. e.
5306	A. S. Speer, Boonville, N. C.....	145 c. e.
5317	A. S. Speer, Boonville, N. C.....	305 c. e.
5383	R. P. Stancil, R. F. D. No. 1, McCullers, N. C.....	665 c. e.
5377	P. M. Stallings, Macon, N. C.....	72 c. e.
5385	Tom Stroud, R. F. D. No. 1, Chapel Hill, N. C.....	182 c. e.
5272	J. W. Terry, R. F. D. No. 1, Cedar Grove, N. C.....	127 c. e.
5378	W. F. Thomasson, R. F. D. No. 1, Zebulon, N. C.....	200 c. e.
5215	Pervis Tilley, Bahama, N. C.....	9,527 c. e.
5216	Pervis Tilley, Bahama, N. C.....	8,166 c. e.
5332	O. B. Umstead, Stagville, N. C.....	195 c. e.
5290	C. H. Underhill, Wendell, N. C.....	245 c. e.
5233	J. H. Wallace, R. F. D. No. 1, Pinnacle, N. C.....	100 c. e.
5226	J. W. Watson, R. F. D. No. 6, Durham, N. C.....	173 c. e.
5231	J. W. Watson, R. F. D. No. 6, Durham, N. C.....	190 c. e.
5324	J. W. Watson, R. F. D. No. 6, Durham, N. C.....	100 c. e.
5213	D. G. Weaver, Walthall, N. C.....	900 c. e.
5219	H. T. Weaver, Walthall, N. C.....	775 c. e.
5246	J. L. Whitaker, R. F. D. No. 3, Pinnacle, N. C.....	88 c. e.
5269	Wm. M. Whitefield, R. F. D. No. 3, Hurdle Mills, N. C.....	330 c. e.
5333	T. B. Wilder, Louisburg, N. C.....	155 c. e.
5299	E. W. Wilkins, R. F. D. No. 2, Burlington, N. C.....	180 c. e.
5330	D. J. Williams, R. F. D. No. 1, Apex, N. C.....	90 c. e.
5384	J. E. Williams, R. F. D. No. 1, Chapel Hill, N. C.....	235 c. e.
5382	J. T. Williams, Stokesdale, N. C.....	245 c. e.
5344	W. J. Wilson, Apex, N. C.....	370 c. e.
Total.....		59,362 c. e.



TABLE No. 6.

AGRICULTURAL SEEDS FROM THE FOLLOWING 53 WHOLESALE DEALERS  
WERE COLLECTED FROM THE NORTH CAROLINA MARKET AND TESTED.

<i>Dealer.</i>	<i>Location.</i>
Adams Grain and Provision Co.....	Asheville, N. C.
Adams Grain and Provision Co.....	Charlotte, N. C.
Adams Grain and Provision Co.....	Richmond, Va.
Baldwin Feed Co.....	Johnson City, Tenn.
Beveridge, S. T., & Co.....	Richmond, Va.
Blamburg Bros. ....	Baltimore, Md.
Bolciano, J., & Son.....	Baltimore, Md.
Brent, C. S.....	Lexington, Ky.
Buffington, J. J., & Co.....	Baltimore, Md.
Buist, Robert, Co. ....	Philadelphia, Pa.
Carter, Venable & Co.....	Richmond, Va.
City Hay and Grain Co.....	Norfolk, Va.
Clute, C. A., & Co.....	Clinton, N. C.
Cooper-Riddick Co. ....	Norfolk, Va.
Corbett Co., The .....	Wilmington, N. C.
Diggs & Beadles.....	Richmond, Va.
Dixon, D. H. ....	Goldsboro, N. C.
Durham Seed House .....	Durham, N. C.
Gillette Grain Co. ....	Nashville, Tenn.
Griffith-Turner Co. ....	Baltimore, Md.
Hackney, Broyles & Lackey.....	Knoxville, Tenn.
Hales, J. R. ....	Nashville, Tenn.
Hall & Pearsall .....	Wilmington, N. C.
Hardin, Hamilton & Lewman.....	Louisville, Ky.
Harris Grain Co. ....	Nashville, Tenn.
Hines, E. G. ....	Goldsboro, N. C.
Jones, Chas. D. ....	Nashville, Tenn.
Kansas City Seed and Grain Co.....	Kansas City, Mo.
Landreth, D., Seed Co.....	Bristol, Pa.
Louisville Seed Co. ....	Louisville, Ky.
McNair & Pearsall .....	Wilmington, N. C.
Mayo Milling Co.....	Richmond, Va.
National Seed Co. ....	Louisville, Ky.
Parsons & Hardison.....	Wadesboro, N. C.
Philadelphia Seed Co. ....	Philadelphia, Pa.
Phillips-Patterson Co. ....	Richmond, Va.
Richardson, W. F., Jr., & Co.....	Richmond, Va.
Roanoke Seed and Supply Co.....	Roanoke, Va.
Roper & Co. ....	Petersburg, Va.
Salzer, Jno. A., Seed Co.....	La Crosse, Wis.
Savage, N. R., & Sons.....	Richmond, Va.
Scarlett, Wm. G., & Co.....	Baltimore, Md.
Slate Seed Co. ....	South Boston, Va.
Slayden, Fakes & Co. ....	Asheville, N. C.
Smith Seed and Feed Co.....	Danville, Va.
Southern Distributing Co. ....	Norfolk, Va.
Stricker, L. R. ....	Asheville, N. C.
Tate, W. R. ....	Nashville, Tenn.
Thalman & Co. ....	New York, N. Y.
Wilson, W. B. ....	Greenville, N. C.
Wilson & Hill .....	Warsaw, N. C.
Wood, T. W., & Sons.....	Richmond, Va.
Wood, Stubbs & Co.....	Louisville, Ky.

TABLE No. 7.

ADDRESSES AND NAMES OF 251 RETAIL DEALERS IN 118 TOWNS, FROM  
WHOM AGRICULTURAL SEED SAMPLES WERE COLLECTED AND TESTED.

<i>Location.</i>	<i>Dealer.</i>
Aberdeen .....	Mark Wimberley.
Ahoskie .....	S. L. Dilday.
Albemarle .....	Morrow Bros. & Heath Co.
Andrews .....	W. B. Fisher.
Apex .....	Apex Mule and Supply Co.
Apex .....	A. B. Hunter & Co.
Asheboro .....	Randolph Supply Co.
Asheboro .....	J. T. Turner.
Asheville .....	Grant's Pharmacy.
Asheville .....	T. S. Morrison & Co.
Asheville .....	Slayden, Fakes & Co.
Asheville .....	L. R. Stricker.
Aurora .....	L. T. Thompson.
Ayden .....	H. G. Mumford & Co.
Bakersville .....	Baker Bros.
Belhaven .....	J. F. Bishop.
Benson .....	Parris, Goodwin Co.
Black Mountain .....	Carolina Feed Co.
Bryson City .....	D. K. Collins.
Bryson City .....	J. H. Ditmore.
Bryson City .....	R. L. Snelson Co.
Burgaw .....	C. Harrell & Son.
Burlington .....	N. S. Cardwell.
Burlington .....	Jos. A. Iseley & Bro. Co.
Burnsville .....	J. E. Evans.
Canton .....	G. L. Hampton.
Canton .....	J. W. Jones.
Carthage .....	B. Hurwitz & Bro.
Carthage .....	Sinclair Bros.
Carthage .....	J. V. Williamson.
Charlotte .....	Davidson & Wolfe.
Charlotte .....	Farmers Supply Co.
Charlotte .....	Johnston Bros.
China Grove .....	Holshouser & Dayvault.
Clinton .....	W. D. Kelly.
Clinton .....	M. L. Merritt.
Clinton .....	D. M. Partrick & Co.
Clinton .....	J. C. Peterson.
Clinton .....	B. F. Powell.
Concord .....	Cline & Moose.
Concord .....	A. S. Dayvault.
Concord .....	White-Morrison-Flowe' Co.
Concord .....	York & Wadsworth.
Davidson .....	Brown, Knox & Co.
Davidson .....	L. B. Long.
Dillsboro .....	Holmes Bryson.
Dover .....	W. R. Kelly.
Dunn .....	W. D. Holland.
Dunn .....	Jas. E. Jordan.
Dunn .....	W. P. Surles.
Dunn .....	P. G. A. Tart.
Durham .....	Byrd & Bryan.
Durham .....	Carrington-Rogers Drug Co.
Durham .....	Durham Seed House.
Durham .....	Haywood & Boone.
Durham .....	W. E. Mabry.
Elizabeth City .....	W. S. White & Co.

<i>Location.</i>	<i>Dealer.</i>
Elkin .....	D. J. Cockerham & Sons.
Elkin .....	Fairmount Grocery Co.
Elkin .....	S. W. Y. Supply Co.
Elkin .....	L. S. Williams.
Elk Park .....	A. P. Brinkley.
Elk Park .....	W. W. Lineback Hardware Co.
Farmville .....	R. L. Davis & Bro.
Fayetteville .....	J. O. Evans.
Fayetteville .....	A. S. Huske.
Fayetteville .....	McNeill Milling Co.
Franklinton .....	C. S. Williams.
Fuquay Springs .....	Fuquay Springs Drug Co.
Gastonia .....	Gaston Seed and Provision Co.
Gibsonville .....	Gibsonville Hardware & Furniture Co.
Goldsboro .....	M. J. Best & Sons.
Goldsboro .....	Deans & Moyer Co.
Goldsboro .....	Jeffreys & Sons.
Goldsboro .....	H. Neil & Bros.
Goldsboro .....	B. G. Thompson & Sons.
Goldsboro .....	T. N. Waters.
Graham .....	Graham Hardware Co.
Greensboro .....	Carolina Warehouse Co.
Greensboro .....	C. Scott & Co.
Greensboro .....	Tucker & Erwin.
Greenville .....	J. B. Johnston.
Greenville .....	J. R. & J. G. Moyes.
Greenville .....	M. S. Schultz.
Hamlet .....	E. N. Rhodes.
Henderson .....	M. Dorsey.
Henderson .....	Parham Supply Co.
Henderson .....	Powell-Landis Co.
Henderson .....	Geo. A. Rose & Co.
Henderson .....	Thomas Bros.
Hendersonville .....	Byers Bros.
Hendersonville .....	Houston & Sons.
Hickory .....	Boyd Feed Co.
Hickory .....	City Feed Co.
Hickory .....	Hickory Seed Co.
High Point .....	Beeson Hardware Co.
High Point .....	High Point Hardware Co.
Hillsboro .....	H. L. Parrish.
Hillsboro .....	H. W. & J. C. Webb.
Jonesboro .....	W. G. & R. A. Watson.
Kenly .....	J. T. Edgerton & Bro.
Kings Mountain .....	Kiser & Mauney.
Kings Mountain .....	Mauney Bros.
Kings Mountain .....	Patterson Grocery Co.
Kings Mountain .....	Plonk Bros. & Co.
Kinston .....	Ray Dawson.
Kinston .....	Henry Dunn.
Kinston .....	J. E. Hood & Co.
Kinston .....	E. B. Marston Drug Co.
Kinston .....	T. W. Mewborne & Co.
Kittrell .....	Crudup, Kittrell & Co.
Kittrell .....	Overton Kearney.
Kittrell .....	B. B. Woodlief.
La Grange .....	Isler & Perle.
La Grange .....	J. P. Walters.
Laurinburg .....	D. C. McNeill.
Lenoir .....	Harrison & Co.
Lexington .....	S. L. Owen.
Lillington .....	McPherson Drug Co.

<i>Location.</i>	<i>Dealer.</i>
Lincolnton .....	Lincoln Farmers Union Warehouse Co.
Lincolnton .....	Lowling & Costner.
Lincolnton .....	J. H. Rudisill & Co.
Littleton .....	Eugene Johnston.
Littleton .....	S. J. Stallings.
Louisburg .....	B. G. Hicks.
Louisburg .....	L. P. Hicks.
Louisburg .....	McKinne Bros. Co.
Louisburg .....	P. A. Reavis & Co.
Lumberton .....	L. H. Caldwell.
Lumberton .....	R. D. Caldwell & Son.
Lunday .....	W. B. Ellis.
Madison .....	City Grocery and Hardware Co.
Madison .....	Madison Grocery Co.
Madison .....	T. D. Meador Grocery Co.
Marshall .....	Farmers Union Warehouse.
Marshall .....	W. J. Gudger & Sons.
Marshall .....	T. N. James & Co.
Marshall .....	Tweed & Franklin.
Mebane .....	Nelson-Ray Co.
Mebane .....	Smith & Miles.
Mocksville .....	Dwiggins & Green.
Mocksville .....	C. C. Sanford's Sons Co.
Monroe .....	F. B. Ashcraft.
Mooreville .....	Harris & McNeely Co.
Mooreville .....	H. N. Johnston & Co.
Mooreville .....	W. M. Neel & Co.
Morganton .....	Leslie's Drug Store.
Mount Airy .....	W. E. Merritt & Co.
Mount Airy .....	Mount Airy Feed Store.
Mount Airy .....	Arnold Quesinberry.
Mount Airy .....	F. L. Smith.
Murphy .....	Jno. E. Fain.
Murphy .....	Wafford, Fain Co.
Nashville .....	King Coöperative Co.
Nashville .....	Nash Supply Co.
Nashville .....	Ricks, Alford, Batchelor Co.
Nashville .....	B. H. B. Vester.
Nashville .....	J. D. Winstead.
New Bern .....	J. F. Clarke.
New Bern .....	C. B. Hill.
Newton .....	George Moose.
North Wilkesboro .....	Clarence Call.
Oxford .....	J. D. Brooke.
Oxford .....	J. W. & D. S. Fuller.
Oxford .....	Horner Bros.
Oxford .....	Lyon-Winston Co.
Oxford .....	L. Thomas.
Plymouth .....	W. H. Hampton & Son.
Polkton .....	Allen Bennett.
Polkton .....	Davis, Ross & Co.
Raeford .....	N. S. Blue & Co.
Raeford .....	Hoke Mercantile Co.
Raeford .....	McLaughlin Co.
Raleigh .....	S. J. Adams.
Raleigh .....	W. A. Myatt.
Raleigh .....	F. W. Parker Drug Co.
Raleigh .....	J. P. Wyatt's Sons Co.
Reidsville .....	R. M. Gillie.
Reidsville .....	Harris Bros.
Reidsville .....	Hazell & Mims.
Reidsville .....	C. H. Pettigrew.

<i>Location.</i>	<i>Dealer.</i>
Reidsville .....	W. P. Ware.
Richlands .....	W. P. Thomas.
Robersonville .....	W. A. Roberson & Co.
Rockingham .....	E. N. Covington & Co.
Rockingham .....	Watson-King Co.
Rocky Mount .....	H. C. Joyner.
Roxboro .....	Moore Bros. Co.
Roxboro .....	L. G. Stanfield & Co.
Roxboro .....	Hugh Woods.
Rural Hall .....	E. L. Kiser & Co.
Rutherfordton .....	Dr. T. B. Twitty Drug Co.
Salisbury .....	W. L. Kluttz.
Salisbury .....	M. C. Ruffy.
Salisbury .....	Union Warehouse and Trading Co.
Sanford .....	Lee Store Co.
Sanford .....	Wilkins, Ricks & Co.
Scotland Neck .....	W. T. Hancock & Co.
Scotland Neck .....	M. Hoffman & Bro.
Selma .....	Selma Supply Co.
Shelby .....	H. E. Kendall.
Shelby .....	Paul Webb.
Smithfield .....	Austin-Stephenson Co.
Snow Hill .....	J. Exum & Co.
Statesville .....	W. B. Gibson.
Statesville .....	Iredell Feed and Seed Store.
Statesville .....	Miller-McLain Supply Co.
Statesville .....	Sherrill & Reese.
Statesville .....	J. E. Sloop.
Sylva .....	Sylva Supply Co.
Tarboro .....	W. S. Clark & Sons.
Tarboro .....	R. E. L. Cook.
Tarboro .....	R. B. Peters.
Taylorsville .....	J. B. Barnes.
Toecane .....	Blevins Bros.
Toecane .....	J. R. Garvin.
Wadesboro .....	H. W. Little & Co.
Wake Forest .....	C. Y. Holden & Co.
Wake Forest .....	T. E. Holding & Co.
Wallace .....	Wallace Grocery Co.
Walnut Cove .....	Farmers' Supply Store.
Walnut Cove .....	Fulton & Davis.
Walnut Cove .....	Joyce, Jones & Co.
Walnut Cove .....	Walnut Cove Grocery Co.
Warsaw .....	Hobbs & Russ.
Warsaw .....	Wilson & Hill.
Washington .....	A. J. Cox & Co.
Washington .....	Walter Credle & Co.
Washington .....	J. Haven.
Washington .....	E. K. Willis.
Waynesville .....	Chautauqua Drug Co.
Weldon .....	Weldon Grocery Co.
Whiteville .....	Oscar High.
Williamston .....	Anderson-Crawford Co.
Williamston .....	Harrison Bros. & Co.
Wilmington .....	R. R. Bellamy.
Wilmington .....	D. L. Gore.
Wilmington .....	W. J. Kirkham.
Wilson .....	Hadley, Harris & Co.
Wilson .....	Doane Herring.
Wilson .....	Ruffin-High Co.
Wilson .....	P. L. Woodard Co.
Wingate .....	J. L. Austin & Co.

<i>Location.</i>	<i>Dealer.</i>
Windsor .....	J. E. R. Perry & Co.
Windsor .....	Stokes & Tadlock.
Winston-Salem .....	Sam T. Davis.
Winston-Salem .....	Farmers' Cash Seed and Feed Co.
Winston-Salem .....	Farmers' Union Agency Co.
Winterville .....	A. O. Beddard.
Youngsville .....	B. G. Allen.
Youngsville .....	J. R. Pearce.
Youngsville .....	Winston-Blanks Drug Co.
Zebulon .....	N. B. Finch & Co.

## TABLE No. 8.

AGRICULTURAL SEED SAMPLES WERE COLLECTED IN THE FOLLOWING 73 COUNTIES.

Alamance.	Granville.	Pender.
Alexander.	Greene.	Person.
Anson.	Guilford.	Pitt.
Beaufort.	Halifax.	Randolph.
Bertie.	Harnett.	Richmond.
Brunswick.	Haywood.	Robeson.
Buncombe.	Henderson.	Rockingham.
Burke.	Hertford.	Rowan.
Cabarrus.	Iredell.	Rutherford.
Caldwell.	Jackson.	Sampson.
Catawba.	Johnston.	Scotland.
Cherokee.	Lee.	Stanly.
Chowan.	Lenoir.	Stokes.
Cleveland.	Lincoln.	Surry.
Columbus.	Madison.	Swain.
Craven.	Martin.	Union.
Cumberland.	McDowell.	Vance.
Davidson.	Mecklenburg.	Wake.
Davie.	Mitchell.	Washington.
Duplin.	Moore.	Wayne.
Durham.	Nash.	Wilkes.
Edgecombe.	New Hanover.	Wilson.
Forsyth.	Onslow.	Yancey.
Franklin.	Orange.	
Gaston.	Pasquotank.	

TABLE No. 9.

ADDRESSES AND NAMES OF 128 RETAIL DEALERS IN 80 TOWNS, FROM WHOM VEGETABLE SEED SAMPLES WERE COLLECTED AND TESTED.

<i>Location.</i>	<i>Dealer.</i>
Aberdeen	B. D. Wilson.
Ahoskie	Ahoskie Supply Co.
Albemarle	Morrow Bros. & Heath Co.
Andrews	W. B. Fisher.
Asheboro	J. T. Turner.
Asheville	Grant's Pharmacy.
Ayden	M. M. Sauls.
Bayboro	J. W. Cowell.
Beaufort	Beaufort Drug Co.
Beaufort	Hancock & Co.
Beaufort	J. H. Potter, Jr.
Belhaven	J. F. Bishop.
Black Mountain	Kelly & Sons.
Burlington	Jos. A. Iseley & Bro. Co.
Catawba	Coulter & Little.
Charlotte	T. W. Kendrick.
Clinton	R. B. Herring & Co.
Clinton	J. C. Peterson.
Clinton	B. F. Powell.
Concord	Cabarrus Drug Co.
Dover	H. E. Daugherty.
Drexel	Berry Bros.
Dunn	W. P. Surles.
Durham	Carrington-Rogers Drug Co.
Durham	Durham Seed House.
Durham	Five Points Drug Co.
Durham	W. A. Mabry.
Edenton	W. A. Leggett.
Fayetteville	A. S. Huske.
Franklin	Barnard & Co.
Fuquay Springs	Fuquay Springs Drug Co.
Gastonia	Gaston Seed and Provision Co.
Goldsboro	Jeffreys & Son.
Goldsboro	J. H. Pate.
Goldsboro	T. N. Waters & Bro.
Graham	W. J. Nicks.
Greensboro	Carolina Warehouse.
Greensboro	Jennings & Co.
Greensboro	Scott Seed Co.
Greenville	J. W. Bryan.
Greenville	M. S. Schultz.
Greenville	Warren Drug Co.
Henderson	W. W. Parker.
Henderson	Thomas Bros.
Hendersonville	Hunter's Pharmacy.
Hickory	Boyd Feed Co.
Hickory	City Feed Co.
Hickory	Newton & Hamrick.
Hillsboro	E. A. Rosemond.
Huntersville	S. T. Holbrook.
Kinston	Henry Dunn.
Kinston	J. E. Hood & Co.
Kinston	E. B. Marston Drug Co.
Kinston	Temple Drug Co.
La Grange	Floyd Barwick.
La Grange	Isler & Peele.
Lexington	Smith Grocery Co.

<i>Location.</i>	<i>Dealer.</i>
Lincolnton .....	J. H. Rudisill & Co.
Madison .....	City Grocery and Hardware Co.
Madison .....	T. D. Meador Grocery Co.
Madison .....	C. H. Scales.
Marion .....	Davis Pharmacy.
Matthews .....	Matthews Drug Co.
Maxton .....	J. W. Carter.
Mebane .....	Mebane Drug Co.
Mebane .....	H. E. Wilkinson Co.
Monroe .....	English Drug Co.
Monroe .....	Landreth Drug Co.
Monroe .....	Lathan & Richardson.
Moorestville .....	Miller-White Co.
Morganton .....	Mack Kincaid.
Morganton .....	S. P. Kirksey.
Morganton .....	Leslie's Drug Store.
Morganton .....	P. F. Newton & Co.
Murfreesboro .....	T. H. Nicholson.
Murphy .....	R. H. Hyatt & Co.
Nashville .....	Ricks, Alford, Batchelor Co.
New Bern .....	Burrus & Parker.
New Bern .....	J. F. Clarke.
New Bern .....	Duffey's Pharmacy.
New Bern .....	Chas. B. Hill.
New Bern .....	C. L. Spencer.
New Bern .....	S. W. Willis.
Newton .....	Clapp's Drug Store.
Newton .....	Freeze Drug Store.
Oriental .....	W. J. Morgan.
Oxford .....	J. G. Hall.
Oxford .....	Hamilton Drug Co.
Plymouth .....	W. W. Hampton & Son.
Plymouth .....	J. C. Spruill.
Raleigh .....	S. J. Adams.
Raleigh .....	Job P. Wyatt's Sons Co.
Reidsville .....	Tucker's Drug Store.
Reidsville .....	W. P. Ware.
Richlands .....	Cox Drug Co.
Rocky Mount .....	H. C. Joyner.
Roxboro .....	Hugh Woods.
Saluda .....	J. T. Thompson.
Sanford .....	J. H. Monger.
Scotland Neck .....	M. Hoffman & Bro.
Shelby .....	H. E. Kendall.
Shelby .....	J. E. Webb.
Smithfield .....	Creech Drug Co.
Smithfield .....	W. M. Sanders.
Snow Hill .....	W. P. Carroll & Son.
Southport .....	P. O. Leggett.
Southport .....	Watson's Pharmacy.
Springhope .....	A. C. Yarborough.
Statesville .....	Sherrill & Reece.
Tarboro .....	R. E. L. Cook.
Tarboro .....	Cummings Grocery Co.
Wadesboro .....	Fox & Lyon.
Wadesboro .....	Parsons Drug Co.
Walnut Cove .....	Farmers Supply Store.
Warsaw .....	J. W. Johnson.
Warsaw .....	Warsaw Drug Co.
Washington .....	Blount Pharmacy.
Washington .....	A. J. Cox & Co.
Washington .....	H. H. Satterthwaite.



<i>Location.</i>	<i>Dealer.</i>
Washington .....	Worthy & Ethredge.
Waynesville .....	Chautauqua Drug Co.
Whiteville .....	Oscar High.
Williamston .....	W. J. Hodges.
Wilmington .....	R. R. Bellamy.
Wilmington .....	W. J. Kirkham & Co.
Wilson .....	Ruffin-High Co.
Winston .....	Farmers' Union Agency Co.
Winston .....	Farmers' Cash Feed and Seed Store.
Winterville .....	A. O. Beddard.

TABLE No. 10.

VEGETABLE SEEDS FROM THE FOLLOWING 18 WHOLESALE DEALERS WERE  
COLLECTED FROM THE NORTH CAROLINA MARKET AND TESTED.

<i>Dealer.</i>	<i>Location.</i>
American Seed Co. ....	Detroit, Mich.
Barnard, W. W., & Co. ....	Chicago, Ill.
Bolgiano, J., & Son. ....	Baltimore, Md.
Buist, Robert, Co. ....	Philadelphia, Pa.
Clark, Everett B., Seed Co. ....	Millford, Conn.
Crosman Bros. Co. ....	Rochester, N. Y.
Diggs & Beadles .....	Richmond, Va.
Ferry, D. M., & Co. ....	Detroit, Mich.
Girardeau Seed Co. ....	Monticello, Fla.
Lake Shore Seed Co. ....	Dunkirk, N. Y.
Landreth, D., Seed Co. ....	Bristol, Pa.
Leonard Seed Co. ....	Chicago, Ill.
Pedrick & Son, George R. ....	Pedricktown, N. Y.
Rice, J. B., Seed Co. ....	Cambridge, N. Y.
Rockford Seed Co. ....	Rockford, Ill.
Slate Seed Co. ....	South Boston, Va.
Wood, Stubbs & Co. ....	Louisville, Ky.
Wood, T. W., & Sons. ....	Richmond, Va.

TABLE No. 11.

VEGETABLE SEED SAMPLES WERE COLLECTED IN THE FOLLOWING 59  
COUNTIES.

Alamance.	Gaston.	Nash.
Anson.	Granville.	New Hanover.
Beaufort.	Greene.	Onslow.
Brunswick.	Guilford.	Orange.
Buncombe.	Halifax.	Pamlico.
Burke.	Harnett.	Person.
Cabarrus.	Haywood.	Pitt.
Carteret.	Henderson.	Polk.
Catawba.	Hertford.	Randolph.
Cherokee.	Iredell.	Robeson.
Chowan.	Johnston.	Rockingham.
Cleveland.	Lee.	Sampson.
Columbus.	Lenoir.	Stanly.
Craven.	Lincoln.	Stokes.
Cumberland.	McDowell.	Union.
Davidson.	Macon.	Vance.
Duplin.	Martin.	Wake.
Durham.	Mecklenburg.	Washington.
Edgecombe.	Moore.	Wayne.
Forsyth.		Wilson.

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer		Retail Dealer		Per Cent of Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
6864	ALFALFA.....	J. Bolgiano & Son, Baltimore, Md.....		H. W. & J. C. Webb, Hillsboro, N. C.....		97.40	2.48	.12	89.0
6621	.....do.....	C. S. Brent, Lexington, Ky.....		City Feed Co., Hickory, N. C.....		99.65	.19	.16	93.5
6754	.....do.....	N. R. Savage & Son, Richmond, Va.....		Davidson & Wolfe, Charlotte, N. C.....		99.39	.20	.41	89.5
6755	.....do.....	Win. G. Scarlett & Co., Baltimore, Md.....		J. B. Rudisill & Co., Lincolnton, N. C.....		99.78	.18	.04	83.5
6624	.....do..... ( <i>Duller</i> .)	.....do.....		Dr. T. B. Twitty Drug Co., Rutherfordton, N. C.....		99.50	.21	.29	88.5
6979	.....do.....	T. W. Wood & Sons, Richmond, Va.....		L. H. Caldwell, Lumberton, N. C.....		99.67	.33		453.5
6752	.....do.....	.....do.....		Cline & Moose, Concord, N. C.....		99.65	.27	.08	82.5
6978	.....do.....	.....do.....		J. B. Johnston, Greenville, N. C.....		99.74	.20	.06	92.0
6622	.....do.....	.....do.....		Mauney Bros., Kings Mountain, N. C.....		99.32	.46	.22	86.5
6623	.....do.....	.....do.....		Patterson Grocery Co., Kings Mountain, N. C.....		99.75	.19	.06	91.0
7090	.....do.....	.....do.....		Paul Webb, Shelby, N. C.....		99.47	.18	.35	86.5
6753	.....do.....	.....do.....		.....do.....		99.73	.23	.04	86.5
7312	.....do.....	American grown.....		L. R. Strickler, Asheville, N. C.....		99.82	.18		95.0
7320	.....do.....	Imported seed.....		Grant's Pharmacy, Asheville, N. C.....		99.52	.36	.12	95.0
6620	.....do.....	.....do.....		L. R. Strickler, Asheville, N. C.....		99.38	.30	.32	92.5
6781	BARLEY.....	N. R. Savage & Son, Richmond, Va.....		Davidson & Wolfe, Charlotte, N. C.....		98.93	.88	.19	98.5
7149	BEANS, SOYA..... ( <i>Chaut</i> .)	T. W. Wood & Sons, Richmond, Va.....		S. E. Dilday, Ahsokie, N. C.....					99.0
7049	BILLION-DOLLAR GRASS.....	John A. Salzer Seed Co., La Crosse, Wis.....		Ruffin-High Co., Wilson, N. C.....		99.60	.30	.10	97.5
6638	BLUE GRASS, KENTUCKY.....	S. T. Beveridge & Co., Richmond, Va.....		J. H. Ditmore, Bryson City, N. C.....		*73.06	26.36	.58	50.0

6729	do.	J. J. Bolgiano & Son, Baltimore, Md.	H. E. Kendall, Shelby, N. C.	*68.93	30.67	.40	53.5
7093	do.	do.	do.	*75.38	24.05	.59	†31.0
7281	do.	C. S. Brent, Lexington, Ky.	Hickory Seed Co., Hickory, N. C.	81.71	17.90	.39	†18.5
6734	do.	do.	C. Scott & Co., Greensboro, N. C.	*74.64	25.07	.29	†42.0
6733	do.	J. J. Buffington & Co., Baltimore, Md.	Beeson Hardware Co., High Point, N. C.	83.15	16.17	.68	†24.0
6870	do.	do.	Durham Seed House, Durham, N. C.	*75.10	24.61	.29	†16.0
7182	do.	Carter, Venable & Co., Richmond, Va.	Houston & Sons, Hendersonville, N. C.	80.52	19.10	.38	56.0
7280	do.	do.	Iredell Seed & Feed Store, Statesville, N. C.	84.64	14.87	.49	54.5
7055	do.	Diggs & Beadles, Richmond, Va.	F. W. Parker Drug Co., Raleigh, N. C.	*78.69	20.94	.37	66.0
6982	do.	Griffith-Turner Co., Baltimore, Md.	A. S. Huske, Fayetteville, N. C.	81.59	18.22	.19	†33.0
6728	do.	Hardin, Hamilton & Lewman, Louisville, Ky.	Davidson & Wolfe, Charlotte, N. C.	*71.31	28.19	.20	†29.0
7288	do.	do.	John E. Fain, Murphy, N. C.	87.53	11.50	.97	†28.0
6639	do.	do.	do.	*78.95	20.85	.20	†41.5
7183	do.	do.	W. J. Gudger & Sons, Marshall, N. C.	*74.74	24.22	1.04	†33.5
7056	do.	do.	W. A. Myatt, Raleigh, N. C.	81.50	17.34	1.16	†26.0
6727	do.	do.	W. M. Neel & Co., Mooresville, N. C.	82.75	16.95	.30	45.5
6869	do.	do.	W. P. Ware, Reidsville, N. C.	79.89	19.84	.30	†30.0
7285	do.	N. R. Savage & Son, Richmond, Va.	D. J. Cockerham & Son, Elkin, N. C.	85.81	13.89	.30	†11.5
7284	do.	do.	Fairmount Grocery Co., Elkin, N. C.	86.21	13.33	.46	†35.5
6868	do.	do.	Hazell & Mims, Reidsville, N. C.	81.73	17.60	.67	61.0
7286	do.	do.	W. E. Merritt & Co., Mt. Airy, N. C.	86.87	12.54	.59	†22.0
7283	BLUE GRASS, KENTUCKY	N. R. Savage & Sons, Richmond, Va.	Arnold Quesinberry, Mt. Airy, N. C.	*78.27	21.26	.47	†13.5
7180	do.	Wm. G. Scarlett & Co., Baltimore, Md.	Cline & Moose, Concord, N. C.	81.71	17.43	.86	63.0
7287	do.	L. R. Stricker, Asheville, N. C.	Holmes Bryson, Dillsboro, N. C.	89.25	10.35	.40	†35.5
6732	do.	T. W. Wood & Sons, Richmond, Va.	Cline & Moose, Concord, N. C.	79.84	19.36	.80	†36.0

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 743 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1911 TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed Per Cent of	Inert Matter Per Cent of	Foreign Seed Per Cent of	Germination Per Cent of
7279	BLUE GRASS, KENTUCKY.....	T. Wood & Sons, Richmond, Va.	Farmers Union Agency Co., Winston-Salem, N. C.	80.66	18.36	.98	50.5
7278	.....do.....	.....do.....	Joyce, Jones & Co., Walnut Cove, N. C.	86.75	12.49	.76	126.0
7178	.....do.....	.....do.....	Leslie's Drug Store, Morganton, N. C.	83.52	15.45	1.03	126.5
7152	.....do.....	.....do.....	W. A. Mabry, Durham, N. C.	80.31	19.11	.58	127.0
7179	.....do.....	.....do.....	S. L. Owen, Lexington, N. C.	80.85	18.60	.55	54.5
6731	.....do.....	.....do.....	M. C. Ruffy, Salisbury, N. C.	*63.14	31.62	5.24	135.0
6730	.....do.....	.....do.....	Paul Webb, Shelby, N. C.	80.17	18.94	.89	134.5
7094	.....do.....	Wood, Stubbs & Co., Louisville, Ky.	Davidson & Wolfe, Charlotte, N. C.	*72.67	26.87	.46	113.0
7282	.....do.....	Kentucky grown.....	L. R. Stricker, Asheville, N. C.	85.21	13.91	.88	142.5
7181	.....do.....	Imported seed.....	Grant's Pharmacy, Asheville, N. C.	*78.04	21.58	.38	139.5
7095	CANE.....	Kansas City Seed & Grain Co., Kansas City, Mo.	H. W. Little & Co., Wadesboro, N. C.	*92.55	7.33	.12	92.0
7096	.....do.....	.....do.....	.....do.....	96.52	3.29	.19	86.5
7100	.....do.....	Parsons & Hardison, Wadesboro, N. C.	J. L. Austin & Co., Wingate, N. C.	*92.43	7.57	-----	89.0
7099	.....do.....	.....do.....	.....do.....	*93.16	6.84	-----	86.5
7098	.....do.....	.....do.....	Davis Ross & Co., Polkton, N. C.	97.02	2.64	.34	90.5
7097	.....do..... ( <i>Chenit</i> )	.....do.....	.....do.....	*91.49	8.46	.05	91.0
7310	CANE (SUDAN GRASS).....	Texas grown.....	L. R. Stricker, Asheville, N. C.	*94.45	5.55	-----	80.0
7147	CLOVER, ALSIKE.....	Diggs & Beallies, Richmond, Va.	Durham Seed House, Durham, N. C.	*93.49	.65	5.86	88.0

7309	do	Farmer's Union Agency Co., Winston-Salem, N. C.	*94.46	.50	5.04	†70.5
7173	do	T. W. Wood & Sons, Richmond, Va.	98.30	.63	1.07	88.5
6785	do	do	97.31	.33	2.36	87.5
7083	do	Gaston Seed & Provision Co., Gastonia, N. C.	98.33	.72	.95	86.8
7308	do	Indiana grown	98.95	.34	.71	95.5
7089	do	T. W. Wood & Sons, Richmond, Va.	90.43	9.55	.02	65.5
6611	do	do	97.56	2.14	.30	†74.0
6581	do	do	*95.62	4.11	.27	95.5
7303	do	Baldwin Feed Co., Johnson City, Tenn.	*94.16	5.16	.68	95.0
6687	do	S. T. Beveridge & Co., Richmond, Va.	*87.62	4.62	7.76	98.5
6588	do	do	*96.42	2.90	.68	99.0
6587	do	do	98.24	1.62	.14	99.5
6830	do	do	*97.36	1.88	.76	80.5
6590	do	J. Bolgiano & Son, Baltimore, Md.	*95.74	1.88	2.38	89.5
6967	do	do	*94.62	4.86	.52	97.0
6819	do	J. J. Buffington & Co., Baltimore Md.	*96.60	2.07	1.24	93.0
6682	do	do	*97.38	1.23	1.39	89.0
6962	do	Carter, Venable & Co., Richmond, Va.	*95.58	3.27	1.15	94.0
6841	do	do	*95.42	3.52	1.06	94.5
7025	do	do	98.25	1.10	.65	93.0
6578	do	do	*96.45	2.84	.71	95.0
6840	do	(Wild mustard.)	99.24	.72	.04	†80.0
6839	do	do	*94.91	2.93	2.16	93.0
6966	do	do				
6963	do	do				

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer		Retail Dealer		Per Cent of Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
66683	CLOVER, CRIMSON	Carter, Venable & Co., Richmond, Va.		C. Scott & Co., Greensboro, N. C.		*96.83	2.38	.79	96.0
6964	do	do		J. D. Winstead, Nashville, N. C.		*96.05	2.38	1.57	93.5
6965	do	do		do		*96.30	1.85	1.85	90.5
6834	do	Diggs & Beadles, Richmond, Va.		Byrd & Bryan, Durham, N. C.		98.07	.61	1.32	85.0
6833	do	do		do		*96.88	2.08	1.04	97.0
6832	do	do		M. Dorsey, Henderson, N. C.		*95.01	2.22	2.77	84.5
6831	do	do		do		*97.25	1.68	1.07	96.0
6969	do	do		J. T. Edgerton & Bro., Kenly, N. C.		*95.83	3.30	.87	95.0
6835	do	do		Horner Bros., Oxford, N. C.		98.57	.56	.87	94.0
6968	do	do		Jeffreys & Sons, Goldsboro, N. C.		*95.33	3.77	.70	94.5
6684	do	do		C. Scott & Co., Greensboro, N. C.		98.41	.71	.85	87.0
6829	do	Durham Seed House, Durham, N. C.		Apex Mule & Supply Co., Apex, N. C.		*95.87	1.47	2.66	96.0
6828	do	do		do		*95.02	4.02	.96	96.0
6665	do	Roanoke Seed & Supply Co., Roanoke, Va.		Carolina Warehouse Co., Greensboro, N. C.		*96.76	2.27	.97	†80.5
6686	do	do		F. L. Smith, Mt. Airy, N. C.		*96.59	2.97	.47	†76.0
6823	do	Roper & Co., Petersburg, Va.		Eugene Johnston, Littleton, N. C.		*96.92	2.55	.53	92.5
6822	do	do		J. R. Pearce, Youngsville, N. C.		*96.33	3.00	.67	93.0
6824	do	do		S. J. Stallings, Littleton, N. C.		*94.18	5.20	.62	91.0
6837	do	N. R. Savage & Son, Richmond, Va.		J. D. Brooks, Oxford, N. C.		*93.68	4.96	1.36	95.0
6690	do	do		Clarence Call, N. Wilkesboro, N. C.		*96.62	2.19	1.19	96.0

6662	do	D. J. Cockerham & Sons, Elkin, N. C.	*95.21	3.79	1.00	95.5
6689	do	Farmers Supply Co., Charlotte, N. C.	*96.43	1.74	1.83	90.5
6836	do	J. W. & D. S. Fuller, Oxford, N. C.	*93.26	5.75	.99	95.0
6688	do	Johnston Bros., Charlotte, N. C.	*97.41	1.33	1.26	89.0
6693	do	W. L. Klutz, Salisbury, N. C.	*95.77	3.75	.48	92.0
7302	do	W. E. Merritt & Co., Mt. Airy, N. C.	*97.34	2.18	.48	137.0
6691	do	C. C. Sanford Sons Co., Mocksville, N. C.	*95.63	3.40	.97	96.5
6838	do	Wilkins, Riels & Co., Sanford, N. C.	*97.06	2.19	.75	175.0
6589	do	Wm. G. Scarlett & Co., Baltimore, Md.	*94.79	4.37	.84	96.0
7148	do	H. W. & J. C. Webb, Hillsboro, N. C.	*96.52	2.93	.55	88.5
6821	do	Moore Bros. & Co., Roxboro, N. C.	*95.28	4.29	.43	96.5
7061	do ( <i>Cheat.</i> )	McPherson Drug Co., Lillington, N. C.	*95.58	3.99	.43	91.0
6820	do	Hugh Woods, Roxboro, N. C.	*96.17	2.80	1.03	95.5
6826	do	Harris Bros., Reidsville, N. C.	*95.27	4.16	.57	95.0
6825	do	Hazell & Mims, Reidsville, N. C.	*95.92	3.52	.56	93.5
6827	do	C. H. Pettigrew, Reidsville, N. C.	*96.28	1.59	2.13	177.0
6591	do	Sylva Supply Co., Sylva, N. C.	97.65	1.78	.57	160.5
7102	do	F. B. Ashcraft, Monroe, N. C.	*97.33	1.67	1.00	184.0
6677	do	Beeson, Hardware Co., High Point, N. C.	*95.32	3.72	.96	97.0
6680	do	Brown, Knox Co., Davidson, N. C.	97.65	1.92	.43	91.5
6958	do	L. H. Caldwell, Lumberton, N. C.	*97.62	1.85	.53	89.0
6998	do	R. D. Caldwell & Son, Lumberton, N. C.	97.87	1.72	.41	177.5
6671	do	Carolina Warehouse Co., Greensboro, N. C.	*95.80	3.31	.89	96.0
6672	do	City Grocery Co., Madison, N. C.	*92.81	5.28	1.91	98.0
6844	do	Crudup, Kittrell Co., Kittrell, N. C.	*96.64	.76	2.60	176.5
6662	do	A. S. Dayvault, Concord, N. C.	*96.77	1.70	1.51	182.5

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Per Cent of Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
6663	CLOVER, CRIMSON	T. W. Wood & Sons, Richmond, Va.	A. S. Dayvault, Concord, N. C.	*95.89	3.51	.60	93.0
6669	do	do	Farmers Cash Seed and Feed Co., Winston-Salem, N. C.	*97.46	1.20	1.34	†49.0
6582	do	do	W. B. Fisher, Andrews, N. C.	98.47	1.22	1.31	†79.0
6586	do	do	Gaston Seed & Provision Co., Gastonia, N. C.	97.80	1.53	.67	92.5
6584	do	do	Grant's Pharmacy, Asheville, N. C.	98.31	1.19	.50	†82.5
6668	do	do	Harris & McNeely Co., Mooresville, N. C.	*95.51	1.39	3.10	87.0
6577	do	do	J. Haven, Washington, N. C.	97.67	1.76	.57	95.0
6956	do	do	Doane Herring, Wilson, N. C.	*95.55	3.45	1.00	97.0
6676	do	do	High Point Hardware Co., High Point, N. C.	97.66	1.61	.73	90.0
6681	do	do	Holshouser & Dayvault, China Grove, N. C.	*96.99	2.26	.75	92.0
6969	do	do	A. S. Huske, Fayetteville, N. C.	*96.62	2.00	1.38	†82.0
6961	do	do	J. B. Johnston, Greenville, N. C.	97.52	1.55	.93	†81.0
6675	do	do	H. E. Kendall, Shelby, N. C.	97.83	1.59	.58	†56.5
6679	do	do	L. B. Long, Davidson, N. C.	*97.38	1.86	.76	†81.0
6678	do	do	do	*96.52	1.73	1.75	†78.0
7060	do	do	McPherson Drug Co., Lillington, N. C.	*96.93	2.46	.61	85.0
6665	do	do	Miller-McLain Supply Co., Statesville, N. C.	*97.14	1.13	1.73	†83.5
6659	do	do	Parham Supply Co., Henderson, N. C.	98.80	.39	.81	†46.0



6585	do	Patterson Grocery Co., Kings Mountain, N. C.	*96.21	3.07	.72	92.0
6583	do	Plonk Bros. & Co., Kings Mountain, N. C.	98.32	.81	.87	86.0
6587	do	E. N. Rhodes, Hamlet, N. C.	*96.93	1.97	1.10	85.0
6842	do	Geo. A. Rose & Co., Henderson, N. C.	*96.71	2.02	1.27	87.5
6667	do	M. C. Ruffy, Salisbury, N. C.	98.76	1.01	.23	†33.0
6673	do	S. W. Y. Supply Co., Elkin, N. C.	*96.10	2.68	1.22	89.0
6670	do	Tucker & Erwin, Greensboro, N. C.	*95.99	1.58	2.43	87.0
6666	do	Union Warehouse & Trading Co., Salisbury, N. C.	*97.15	1.57	1.28	91.0
7301	do	Walnut Cove Grocery Co., Walnut Cove, N. C.	*96.56	1.93	1.51	†44.5
6674	do	Paul Webb, Shelby, N. C.	97.59	1.81	.60	†61.0
6660	do	White-Morrison-Flowe Co., Concord, N. C.	*96.69	2.27	1.04	†51.0
6661	do	do	*96.43	1.39	2.13	92.5
6859	do	J. V. Williams, Carthage, N. C.	*96.82	2.16	1.02	85.5
6843	do	B. B. Woodlief, Kittrell, N. C.	*96.10	2.72	1.13	90.0
6664	do	York & Wadsworth, Concord, N. C.	*97.08	1.46	1.46	†62.0
6818	do	Durham Seed House, Durham, N. C.	*94.91	3.18	1.91	95.5
6594	do	Hickory Seed Co., Hickory, N. C.	*96.45	3.41	.14	96.5
6592	do	L. R. Stricker, Asheville, N. C.	99.05	.35	.60	93.5
6593	do	do	99.24	.41	.35	†77.0
7300	do	do	97.66	2.05	.29	†80.0
7084	CLOVER, JAPAN	T. W. Wood & Sons, Richmond, Va.	95.39	1.09	3.52	60.0
7302	CLOVER, RED	Baldwin Feed Co., Johnson City, Tenn.	97.56	1.15	1.09	94.0
7304	do (Wild carrot.)	Baker Bros., Bakersville, N. C.	97.79	.63	1.38	95.5
7301	do (Wild carrot.)	W. B. Ellis, Lunday, N. C.	96.80	1.00	2.20	89.0
		(Wild carrot.)				

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1913 TO JULY 15, 1914—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed of Per Cent of	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7206	CROVER, RED. ( <i>Wild carrot.</i> )	Baldwin Feed Co., Johnson City, Tenn.	J. E. Evans, Burnsville, N. C.	97.37	1.38	1.25	88.0
7205	do.	do.	J. R. Garvin, Toecane, N. C.	96.58	1.71	1.71	93.0
7203	do.	do.	W. W. Linbeck Hdw. Co., Elk Park, N. C.	98.29	.62	1.09	92.5
6596	do.	S. T. Beveridge & Co., Richmond, Va.	J. H. Dimore, Bryson City, N. C.	99.21	.21	.58	88.0
7222	do.	do.	Dwiggins & Green, Mocksville, N. C.	94.49	2.53	2.98	95.5
7133	do.	do.	Smith & Miles, Mebane, N. C.	98.98	.62	.40	95.5
7220	do.	Blamberg Bros., Baltimore, Md.	Hickory Seed Co., Hickory, N. C.	97.12	2.05	.83	96.5
6598	do.	C. S. Brent, Lexington, Ky.	City Feed Co., Hickory, N. C.	99.29	.39	.35	93.0
7225	do.	do.	do.	96.24	1.92	1.84	92.5
7224	do.	do.	H. W. Harris, Hickory, N. C.	99.29	.51	.20	92.5
6861	do.	J. J. Buffington & Co., Baltimore, Md.	Durham Seed House, Durham, N. C.	94.87	1.76	3.37	83.0
7198	do.	do.	Madison Grocery Co., Madison, N. C.	94.80	3.22	1.98	89.0
7199	do.	do.	J. D. Meador Grocery Co., Madison, N. C.	95.00	2.09	2.91	94.5
7200	do.	do.	do.	96.72	.81	2.47	81.5
6714	do.	do.	do.	96.08	1.05	2.87	77.0
7197	do.	do.	S. J. Stallings, Littleton, N. C.	96.59	1.40	2.01	86.5
6977	do.	Carter, Venable & Co., Richmond, Va.	Hadley, Harris & Co., Wilson, N. C.	98.68	.47	.85	91.0
7154	do.	Diggs & Beadles, Richmond, Va.	Davidson & Wolfe, Charlotte, N. C.	99.08	.62	.30	98.5
6710	do.	do.	White-Morrison-Flowe Co., Concord, N. C.	97.70	.63	1.67	90.5
6599	do.	Hackney, Broyles & Lackey, Knoxville, Tenn.	Tweed & Franklin, Marshall, N. C.	98.89	.44	.67	92.0

6597	do.	Hardin, Hamilton & Lewman, Louisville, Ky.	John E. Fain, Murphy, N. C.	99.37	.42	.21	93.5
7100	do.	do.	W. J. Gudger & Son, Marshall, N. C.	97.98	1.21	.81	90.0
7207	do.	do.	G. L. Hampton, Canton, N. C.	97.75	.90	1.35	91.0
7037	do.	do.	W. A. Myatt, Raleigh, N. C.	98.58	1.17	.25	†79.5
6705	do.	do.	W. M. Neel & Co., Mooresville, N. C.	95.15	1.79	3.06	86.0
6704	do.	do.	do.	95.37	1.44	3.19	87.0
6706	do.	do.	C. Scott & Co., Greensboro, N. C.	95.83	1.47	2.70	87.5
6707	do.	do.	do.	95.11	1.58	3.23	83.5
7203	do.	do.	W. P. Ware, Reidsville, N. C.	95.33	1.47	3.20	87.5
7200	do.	do.	do.	95.71	1.76	2.53	80.0
6839	do.	do.	do.	98.06	.99	.95	†73.5
6713	do.	Louisville Seed Co., Louisville, Ky.	Farmers Union Agency Co., Winston-Salem, N. C.	99.33	.47	.20	82.5
7066	do.	do.	Harrison & Co., Lenoir, N. C.	*87.95	1.35	10.70	86.5
7221	do.	do.	Hickory Seed Co., Hickory, N. C.	98.35	.92	.73	88.5
6605	do.	National Seed Co., Louisville, Ky.	Slayden, Fakes & Co., Asheville, N. C.	97.64	1.95	.41	80.5
7065	do.	Philadelphia Seed Co., Philadelphia, Pa.	J. E. Sloop, Statesville, N. C.	98.52	.65	.83	91.5
6708	do.	Roanoke Seed & Supply Co., Roanoke, Va.	Carolina Warehouse Co., Greensboro, N. C.	98.84	.51	.65	93.5
6709	do.	do.	F. L. Smith, Mt. Airy, N. C.	99.04	.65	.31	93.0
6695	do.	N. R. Savage & Son, Richmond, Va.	Clarence Call, N. Wilkesboro, N. C.	99.17	.52	.31	92.5
6694	do.	do.	Davidson & Wolfe, Charlotte, N. C.	99.08	.35	.57	92.0
7211	do.	do.	D. J. Cockerham & Son, Elkin, N. C.	97.40	1.13	1.47	89.0
7212	do.	do.	Fairmount Grocery Co., Elkin, N. C.	97.09	1.30	1.61	93.5
7132	do.	do.	Graham Hardware Co., Graham, N. C.	97.26	1.62	1.12	93.5
7213	do.	do.	Harris Bros., Reidsville, N. C.	98.62	.67	.71	90.0
7215	do.	do.	W. E. Merritt & Co., Mt. Airy, N. C.	98.20	.90	.90	83.0

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Cent of Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7068	Clover, Red	N. R. Savage & Son, Richmond, Va.	George Moose, Newton, N. C.	99.16	.68	.16	88.5
6696	do.	do.	C. C. Sanford's Sons Co., Mocksville, N. C.	98.72	.57	.71	92.0
7214	do.	do.	Mc. Airy Feed Store, Mt. Airy, N. C.	98.81	.36	.83	85.5
7210	do.	do.	S. W. Y. Supply Co., Elkin, N. C.	98.08	.86	1.06	94.5
7067	do. (Wild carrot.)	Wm. G. Scarlett & Co., Baltimore, Md.	Boyd Feed Co., Hickory, N. C.	99.39	.45	.16	96.5
7134	do.	do.	N. S. Cardwell, Burlington, N. C.	99.08	.52	.40	96.0
6711	do.	do.	Cline & Moose, Concord, N. C.	99.50	.24	.26	92.0
7136	do.	do.	Gibsonville Hardware & Furniture Co., Gibsonville, N. C.	98.62	1.04	.34	95.0
7159	do.	do.	T. N. James & Co., Marshall, N. C.	99.25	.21	.54	92.5
6712	do.	do.	J. H. Rudisill & Co., Lincolnton, N. C.	99.17	.22	.61	86.0
7216	do.	do.	Sylva Supply Co., Sylva, N. C.	99.50	.28	.22	98.0
7135	do.	do.	H. W. & J. C. Webb, Hillsboro, N. C.	99.10	.43	.47	96.5
6858	do.	do.	Moore Bros. & Co., Roxboro, N. C.	99.71	.27	.02	88.0
7315	do.	Slate Seed Co., South Boston, Va.	Carolina Feed Co., Black Mountain, N. C.	98.10	.99	.91	89.5
7219	do. (Wild carrot.)	do.	D. K. Collins, Cherokee, N. C.	98.00	1.75	.25	88.5
6595	do.	do.	D. K. Collins, Dayton City, N. C.	95.74	3.75	.51	88.0
7223	do.	Smith Seed & Feed Co., Danville, Va.	Roseoe Hubbard & Co., Reidsville, N. C.	98.75	1.03	.22	89.5
6860	do.	do.	C. H. Pettigrew, Reidsville, N. C.	98.84	.51	.65	88.5
7218	do.	L. R. Stricker, Asheville, N. C.	J. W. Jones, Canton, N. C.	98.80	.45	.75	93.5

6604	do.....	Sylva Supply Co., Sylva, N. C.....	98.58	.31	1.11	88.0
6603	do.....	do.....	98.52	.57	.91	93.0
7217	do.....	do.....	99.55	.27	.18	94.5
7103	do.....	T. W. Wood & Sons, Richmond, Va.....	98.48	.69	.83	93.5
6575	do.....	J. F. Bishop, Belhaven, N. C.....	99.88	.04	.08	95.0
6697	do.....	J. B. Barnes, Taylorsville, N. C.....	98.48	.68	.86	87.5
7193	do.....	Holmes Bryson, Dillsboro, N. C.....	97.36	1.34	1.30	93.5
7139	do..... (Wild carrot.)	Carrington-Rogers Drug Co., Durham, N.C.	98.42	1.13	.45	93.5
6700	do.....	City Grocery Co., Madison, N. C.....	95.21	1.78	3.01	172.5
7194	do.....	do.....	95.76	2.00	2.24	91.5
7314	do..... (Wild carrot.)	Coulter & Little, Catawba, N. C.....	97.81	1.49	.70	91.5
7192	do..... (Wild carrot.)	Sam T. Davis, Winston-Salem, N. C.....	98.02	1.36	.72	93.5
7191	do..... (Wild carrot.)	Farmers Union Agency Co., Winston-Salem, N. C.....	99.42	.37	.21	96.0
7189	do.....	Fulton & Davis, Walnut Cove, N. C.....	97.36	1.63	1.01	94.5
6601	do..... (Wild carrot.)	Gaston Seed & Prov. Co., Gastonia, N. C.	99.12	.44	.44	91.0
6702	do.....	W. B. Gibson, Statesville, N. C.....	99.52	.30	.18	91.0
6600	do.....	W. J. Gudger & Son, Marshall, N. C.....	98.76	.58	.66	91.0
7138	do.....	Haywood & Boone, Durham, N. C.....	98.15	1.40	.45	95.0
7155	do.....	Houston & Sons, Hendersonville, N. C.....	99.62	.32	.06	89.0
6976	do.....	A. S. Huske, Fayetteville, N. C.....	99.04	.52	.44	95.5
7188	do.....	Joyce, Jones & Co., Walnut Cove, N. C.....	98.92	.71	.38	97.5
7063	do..... (Wild carrot.)	H. E. Kendall, Shelby, N. C.....	98.63	.61	.76	85.0
6698	do.....	do.....	99.21	.61	.18	95.0
6701	do.....	E. L. Kiser & Co.....	98.96	.51	.53	93.5
7062	do..... (Wild carrot.)	W. L. Kluttz, Salisbury, N. C.....	98.47	1.05	.48	94.5

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Per Cent of Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7158	CLOVER, RED..... (Wild carrot.)	T. W. Wood & Sons, Richmond, Va.....	Leslie's Drug Store, Morganton, N. C.....	97.36	.97	1.67	90.0
7064	do.....	do.....	Lincoln Farmers Union Warehouse Co., Lincolnton, N. C.....	97.90	1.45	.65	94.5
6602	do..... (Wild carrot.)	do.....	Mauncy Bros., Kings Mountain, N. C.....	99.50	.49	.01	96.0
7137	do.....	do.....	Nelson-Ray Co., Mebane, N. C.....	99.50	.14	.36	96.5
7195	do.....	do.....	C. H. Pettigrew, Reidsville, N. C.....	99.55	.41	.04	91.0
7157	do.....	do.....	Randolph Supply Co., Asheboro, N. C.....	99.29	.43	.28	94.0
6703	do.....	do.....	M. C. Ruffy, Salisbury, N. C.....	98.92	.88	.20	94.5
7190	do.....	do.....	Sherrill & Reese, Statesville, N. C.....	98.14	1.16	.70	95.5
7196	do.....	do.....	R. L. Snelson, Bryson City, N. C.....	98.47	1.25	.28	94.0
6699	do.....	do.....	S. W. Y. Supply Co., Elkin, N. C.....	99.58	.20	.22	91.5
7156	do.....	do.....	J. T. Turner, Asheboro, N. C.....	98.81	1.09	.10	94.5
7187	do.....	do.....	Walnut Cove Grocery Co., Walnut Cove, N. C.....	99.32	.43	.25	92.5
6856	do.....	do.....	Wilkins, Ricks & Co., Sanford, N. C.....	99.54	.14	.32	95.5
6857	do.....	do.....	Hugh Woods, Roxboro, N. C.....	98.50	.85	.65	81.5
7163	do..... (Wild carrot.)	do.....	Grant's Pharmacy, Asheville, N. C.....	99.31	.39	.30	92.5
7161	do.....	Imported seed	T. S. Morrison & Co., Asheville, N. C.....	98.16	1.30	.54	98.0
7162	do..... (Wild carrot.)	do.....	do.....	92.01	7.34	.65	95.0
6806	do..... (Wild carrot.)	do.....	do.....	99.27	.59	.14	88.5
6807	do.....	Kentucky grown	do.....	99.26	.31	.43	81.5

6608	do. (Dodder.)	American grown.	L. R. Stricker, Asheville, N. C.	99.09	.58	.33	93.5
7226	do. (Wild carrot.)	Indiana grown.	do.	98.07	1.32	.61	92.0
6576	CLOVER, WHITE.	T. W. Wood & Sons, Richmond, Va.	J. F. Bishop, Belhaven, N. C.	99.26	.05	.69	78.0
6610	do.	do.	Gaston Seed & Provision Co., Gastonia, N. C.	97.83	.53	1.64	83.5
7082	do.	do.	do.	91.57	.40	8.03	78.3
6609	do. (Dodder.)	Home-grown seed.	Hickory Seed Co., Hickory, N. C.	*81.69	2.00	15.71	157.3
7050	CORN, FIELD.	Robert Buist Co., Philadelphia, Pa.	J. C. Peterson, Clinton, N. C.				99.0
7128	do.	Diggs & Beadles, Richmond, Va.	N. S. Cardwell, Burlington, N. C.				96.0
7127	do.	do.	do.				98.0
7273	do.	do.	J. E. Sloop, Statesville, N. C.				96.0
7131	do.	D. Landreth Seed Co., Bristol, Pa.	Carolina Warehouse Co., Greensboro, N. C.				99.0
7130	do.	do.	do.				188.0
7129	do.	Slate Seed Co., South Boston, Va.	Jos. A. Iseley & Bro. Co., Burlington, N. C.				97.0
6996	do.	T. W. Wood & Sons, Richmond, Va.	J. W. Carter, Maxton, N. C.				193.0
7274	do.	do.	City Feed Co., Hickory, N. C.				97.5
7171	do.	do.	Cline & Moose, Concord, N. C.				191.0
7172	do.	do.	do.				98.0
7101	do.	do.	Fox & Lyon, Wadesboro, N. C.				98.0
7276	do.	do.	D. J. Kimball, Statesville, N. C.				94.0
6997	do.	do.	P. O. Leggett, Southport, N. C.				99.0
7275	do.	do.	C. H. Scales, Madison, N. C.				95.0
7277	do.	do.	Sherrill & Reese, Statesville, N. C.				186.0
7272	do.	Wood, Stubbs & Co., Louisville, Ky.	Farmers Cash Seed and Feed Store, Winston-Salem, N. C.				92.0
7271	do.	do.	do.				96.0
7270	do.	do.	do.				94.0

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Cent of Foreign Seed	Inert Matter	Pure Cent of Foreign Seed	Per Cent of Germination
7269	CORN, FIELD	Wood, Stubbs & Co., Louisville, Ky.	T. D. Meador Grocery Co., Madison, N. C.				95.0
7186	FESCUE, MEADOW	T. W. Wood & Sons, Richmond, Va.	Randolph Supply Co., Ashboro, N. C.	96.44	3.26	.30	†55.5
6863	GRASS, ITALIAN RYE	Thalman & Co., New York, N. Y.	Durham Seed House, Durham, N. C.	96.45	2.57	.98	†61.0
6781	do.	T. W. Wood & Sons, Richmond, Va.	Farmers Supply Store, Walnut Cove, N. C.	97.11	2.30	.59	†36.0
6753	do.	do.	Farmers Union Agency Co., Winston-Salem, N. C.	96.96	1.78	1.26	†32.5
6941	do.	do.	Doane Herring, Wilson, N. C.	98.71	.97	.32	†65.0
6782	do.	do.	Union Warehouse & Trading Co., Salisbury, N. C.	97.12	1.63	1.20	†37.0
7247	GRASS, ORCHARD	Baldwin Feed Co., Johnson City, Tenn.	W. B. Ellis, Lunday, N. C.	72.80	24.63	2.52	81.0
7246	do.	do.	W. W. Linebach Hardware Co., Elk Park, N. C.	73.31	24.98	1.71	81.0
6615	do.	S. T. Beveridge & Co., Richmond, Va.	J. H. Ditmore, Bryson City, N. C.	78.73	18.11	3.16	80.5
6614	do.	do.	Harrison & Co., Lenoir, N. C.	80.27	15.81	3.92	80.0
7077	do.	do.	do.	83.16	15.86	.98	87.5
7251	do.	Blamberg Bros., Baltimore, Md.	Hickory Seed Co., Hickory, N. C.	71.45	28.01	.54	79.5
6613	do.	C. S. Brent, Lexington, Ky.	City Feed Co., Hickory, N. C.	*48.22	48.70	3.08	86.5
6877	do.	Diggs & Beadles, Richmond, Va.	M. Dorsey, Henderson, N. C.	80.14	19.13	.73	94.5
7250	do.	do.	Farmers Cash Feed & Seed Store, Winston-Salem, N. C.	89.45	9.61	.44	†53.0
7254	do.	Hackney, Broyles & Lackey Co., Knoxville, Tenn.	A. P. Brinkley, Elk Park, N. C.	*37.14	61.95	.91	78.5



6760	do	Hardin, Hamilton & Lewman, Louisville, Ky.	Davidson & Wolfe, Charlotte, N. C.	*65.20	33.22	1.58	92.5
7255	do	do	G. L. Hampton, Canton, N. C.	*66.16	32.70	1.14	73.0
6759	do	do	W. M. Neel & Co., Mooresville, N. C.	85.77	13.59	.64	89.0
6617	do	National Seed Co., Louisville, Ky.	Slayden, Fakes & Co., Asheville, N. C.	75.83	19.33	4.84	166.5
7076	do	Philadelphia Seed Co., Philadelphia, Pa.	J. E. Sloop, Statesville, N. C.	82.60	17.91	.39	80.5
7253	do	Roanoke Seed & Supply Co., Roanoke, Va.	City Grocery & Hardware Co., Madison, N. C.	*65.02	25.26	6.72	84.5
7075	do	N. R. Savage & Son, Richmond, Va.	W. L. Klutz, Salisbury, N. C.	84.93	14.58	.49	84.0
7078	do	do	George Moore, Newton, N. C.	80.73	19.17	.10	83.0
7249	do	do	Mt. Airy Feed Store, Mt. Airy, N. C.	75.33	24.08	.59	71.0
7174	do	Wm. G. Scarlett & Co., Baltimore, Md.	Byers Bros., Hendersonville, N. C.	82.38	13.53	4.00	77.0
7175	do (Wild garlic.)	do	Cline & Moose, Concord, N. C.	83.80	14.36	1.84	81.0
7316	do	Slayden, Fakes & Co., Asheville, N. C.	Carolina Feed Co., Black Mountain, N. C.	69.95	25.59	4.16	72.5
6616	do (Wheat.)	do	D. K. Collins, Bryson City, N. C.	70.72	18.07	5.21	159.0
7252	do	L. R. Stricker, Asheville, N. C.	J. W. Jones, Canton, N. C.	*65.23	34.57	.20	163.5
7074	do	T. W. Wood & Sons, Richmond, Va.	Gaston Seed & Provision Co., Gastonia, N. C.	72.31	24.44	3.35	88.5
6612	do	do	do	75.35	22.53	2.12	90.5
6758	do (Wild garlic.)	do	Harris & McNeely Co., Mooresville, N. C.	81.95	17.68	1.27	75.5
7248	do	do	Holmes Bryson, Dillsboro, N. C.	*69.09	29.17	1.74	79.0
7177	do	do	Leslie's Drug Store, Morganton, N. C.	72.11	25.98	1.88	85.0
7073	do (Wild garlic.)	do	Lincoln Farmers Union Warehouse Co., Lincolnton, N. C.	82.42	16.24	1.34	71.0
6757	do (Wheat.)	do	Miller-McLain Supply Co., Statesville, N. C.	*52.08	45.94	1.38	85.0
7176	do (Wheat.)	do	S. L. Owen, Lexington, N. C.	82.50	16.15	1.55	85.0
6756	do	do	Union Warehouse & Trading Co., Salisbury, N. C.	81.10	17.62	1.28	84.0
6618	do	Kentucky grown	T. S. Morrison & Co., Asheville, N. C.	85.80	10.71	3.49	76.0

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pur Cent of Pure Seed	Pur Cent of Inert Matter	Pur Cent of Foreign Seed	Pur Cent of Germination
7256	GRASS, ORCHARD.....	Imported seed.....	L. R. Stricker, Asheville, N. C.....	82.72	16.85	.43	70.0
7257	do.....	do.....	do.....	82.64	16.81	.55	73.0
5619	do.....	do.....	do.....	84.67	13.40	1.93	77.5
6644	GRASS, TALL OAT.....	S. T. Beveridge & Co., Richmond, Va. ....	Boyd Feed Co., Hickory, N. C.....	74.37	22.59	3.04	88.0
7092	do.....	do.....	do.....	74.92	20.58	4.50	86.0
6643	do.....	do.....	J. H. Ditmore, Bryson City, N. C.....	72.68	24.27	3.05	137.5
7293	do..... (Wild carrot.)	Roanoke Seed and Supply Co., Roanoke, Va.....	Farmers Union Agency Co., Winston-Salem, N. C.....	79.30	20.03	.67	79.0
7091	do.....	N. R. Savage & Son, Richmond, Va.....	Carolina Warehouse Co., Greensboro, N. C.....	88.60	10.92	.48	152.5
6645	do.....	do.....	City Feed Co., Hickory, N. C.....	85.81	9.51	4.68	111.0
7290	do.....	do.....	D. J. Cokerham & Son, Elkin, N. C.....	86.02	10.05	3.93	148.5
6646	do.....	do.....	Gaston Seed & Provision Co., Gastonia, N. C.....	*68.15	30.38	1.47	155.5
7289	do.....	do.....	Arnold Quesinberry, Mt. Airy, N. C.....	91.02	6.42	2.06	150.0
6779	do.....	Wm. G. Scarlett & Co., Baltimore, Md.....	C. Scott & Co., Greensboro, N. C.....	87.67	10.65	1.63	156.0
6640	do.....	L. R. Stricker, Asheville, N. C.....	Sylva Supply Co., Sylva, N. C.....	77.70	12.31	9.99	146.5
6780	do.....	T. W. Wood & Sons, Richmond, Va.....	Carolina Warehouse Co., Greensboro, N. C.....	79.37	18.31	2.29	87.5
7292	do.....	do.....	Holmes Bryson, Dillsboro, N. C.....	81.34	13.24	5.42	164.5
7169	do.....	do.....	Houston & Sons, Hendersonville, N. C.....	79.29	15.00	5.71	163.5
7168	do.....	do.....	S. L. Owen, Lexington, N. C.....	91.73	7.55	.72	91.0
7170	do.....	do.....	J. T. Turner, Asheville, N. C.....	84.00	14.52	1.48	164.5

6874	do.	W. P. Ware, Reidsville, N. C.	76.74	15.31	7.95	161.5
7291	do.	L. S. Williams, Elkin, N. C.	75.21	15.34	9.45	146.0
6642	( <i>Cheat.</i> ) do.	T. S. Morrison, Asheville, N. C.	89.33	9.59	1.08	155.0
6641	do.	L. R. Stricker, Asheville, N. C.	88.18	8.01	3.81	158.0
7294	do.	do.	77.29	14.73	7.98	166.0
7150	MILLET, GERMAN	S. E. Dilday, Alostkie, N. C.	99.88	.12	-----	93.5
7151	do.	Haywood & Boone, Durham, N. C.	97.61	.48	1.91	141.0
7046	do.	J. E. Jordan, Dunn, N. C.	99.49	.43	.08	95.5
7088	do.	J. E. Sloop, Statesville, N. C.	97.74	1.17	1.09	156.0
7024	do.	J. F. Clarke, New Bern, N. C.	99.13	.54	.33	145.5
7311	do.	L. R. Stricker, Asheville, N. C.	99.13	.33	.54	93.0
6895	MILLET, PEARL	R. R. Bellamy, Wilmington, N. C.	*96.18	3.82	-----	87.0
7048	do.	T. N. Waters, Goldsboro, N. C.	*96.66	3.34	-----	87.5
7026	do.	Henry Dunn, Kinston, N. C.	99.40	.60	-----	86.0
7047	do.	Fuquay Springs Drug Co., Fuquay Springs, N. C.	*98.32	1.63	-----	142.0
7027	do.	J. E. Hood & Co., Kinston, N. C.	*98.06	1.94	-----	71.5
7029	do.	Isler & Peele, La Grange, N. C.	*98.22	1.78	-----	77.0
7028	do.	E. B. Marston Drug Co., Kinston, N. C.	*97.25	2.57	.18	73.5
7319	OATS	Carolina Feed Co., Black Mountain, N. C.	*95.50	4.09	.41	98.0
7318	do.	do.	*96.29	3.63	.08	99.0
7317	do.	do.	*95.80	4.20	-----	100.0
6724	do.	Farmers Union Agency Co., Winston-Salem, N. C.	*94.65	5.33	-----	96.0
6725	do.	do.	*95.98	4.02	-----	182.0
6726	do.	do.	*91.41	5.19	3.40	95.0
	( <i>Cheat, corn cockle.</i> )					

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 745 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pur Cent of Pure Seed	Pur Cent of Inert Matter	Pur Cent of Foreign Seed	Pur Cent of Germination
6899	OATS.....	Adams Grain & Provision Co., Charlotte, N. C.	Parris, Godwin Co., Benson, N. C.	*92.29	7.71	-----	98.0
6898	do.....	do.....	J. C. Peterson, Clinton, N. C.	*97.01	2.51	.45	97.0
7034	do.....	Adams Grain & Provision Co., Richmond, Va.	Austin-Stephenson Co., Smithfield, N. C.	*93.50	3.33	2.57	92.0
7035	do.....	do.....	do.....	*96.33	3.41	.26	179.0
7120	do.....	do.....	J. D. Brooks, Oxford, N. C.	*93.63	4.63	2.74	95.5
7033	( <i>Cheat, corn cockle, wild garlic.</i> )	do.....	W. D. Holland, Dunn, N. C.	*96.18	3.24	.58	95.5
6897	do.....	do.....	Wilson & Hill, Warsaw, N. C.	*96.57	2.41	.99	175.0
7110	do.....	S. T. Beverage & Co., Richmond, Va.	Anderson-Crawford Co., Williamston, N. C.	*94.12	5.78	.10	98.0
7071	do.....	do.....	Harrison & Co., Lenoir, N. C.	*95.54	4.22	.24	97.5
7109	do.....	do.....	Harrison Bros. & Co., Williamston, N. C.	*95.47	4.23	.30	98.5
7112	do.....	do.....	M. Hoffman & Bro., Scotland Neck, N. C.	*95.89	3.80	.31	97.5
7111	do.....	do.....	Horner Bros. Co., Oxford, N. C.	*96.61	.99	2.37	95.5
6897	( <i>Cheat, corn cockle, wild garlic.</i> )	do.....	B. Hurwitz & Bro., Carthage, N. C.	*95.43	4.36	.21	96.5
6896	do.....	do.....	do.....	*96.62	3.38	-----	93.5
7107	do.....	do.....	R. B. Peters Grocery Co., Tarboro, N. C.	*94.22	5.20	.58	96.0
7108	( <i>Cheat.</i> )	do.....	do.....	*93.80	4.46	1.74	93.0
7114	do.....	do.....	Smith & Miles, Mebane, N. C.	93.32	1.61	.04	163.0
7113	do.....	do.....	do.....	97.72	2.28	-----	95.5
6895	do.....	do.....	Wallace Grocery Co., Wallace, N. C.	*97.35	2.67	-----	90.5

6804	do.	do.	W. G. & R. A. Watson, Jonesboro, N. C.	*96.75	3.25	97.0
6805	do.	do.	Winston-Blanks Drug Co., Youngsville, N. C.	*97.11	2.89	178.5
7259	do.	Carter, Venable & Co., Richmond, Va.	Lyons-Winston Co., Oxford, N. C.	*89.51	3.90	92.0
6807	do.	do.	Lyons-Winston Co., Oxford, N. C.	*96.81	3.19	166.0
7259	do.	do.	Weldon Grocery Co., Weldon, N. C.	*96.18	3.60	98.5
6806	do.	do.	Hugh Woods, Roxboro, N. C.	*96.38	3.62	93.0
7008	do.	City Hay & Grain Co., Norfolk, Va.	W. H. Hampton & Son, Plymouth, N. C.	*96.55	3.21	99.0
6893	do.	C. A. Clute & Co., Clinton, N. C.	M. S. Merritt, Clinton, N. C.	*95.67	4.23	110
7121	do.	Cooper-Riddick Co., Norfolk, Va.	Stokes & Tadlock, Windsor, N. C.	*94.78	4.12	1.10
6993	do.	Corbett Co., Wilmington, N. C.	D. C. McNeill, Laurinburg, N. C.	*92.67	3.07	4.26
7054	do.	Diggs & Beadles, Richmond, Va.	S. J. Adams, Raleigh, N. C.	*95.51	4.32	.14
7053	do.	do.	do.	98.22	1.78	99.0
7104	do.	do.	F. B. Ashcraft, Monroe, N. C.	*93.91	4.37	1.60
6798	do.	do.	Byrd & Bryan, Durham, N. C.	*95.39	1.45	3.16
6800	do.	do.	do.	*96.24	2.46	1.30
6799	do.	do.	do.	98.48	1.52	96.0
7125	do.	do.	Durham Seed House, Durham, N. C.	*97.06	2.87	.07
6797	do.	do.	do.	*95.51	2.23	2.26
7263	do.	do.	W. T. Hancock & Co., Scotland Neck, N. C.	97.84	1.74	.42
6796	do.	do.	Horner Bros., Oxford, N. C.	97.81	2.19	187.5
6988	do.	do.	A. S. Huske, Fayetteville, N. C.	*96.16	1.33	1.91
6878	do.	do.	Jeffreys & Sons, Goldsboro, N. C.	*96.11	2.91	.98
6894	do.	D. H. Dixon, Goldsboro, N. C.	M. J. Best & Sons, Goldsboro, N. C.	*94.84	5.14	.02
7123	do.	do.	R. L. Davis & Bro., Farmville, N. C.	*95.52	4.14	.34
7010	do.	do.	Ray Dawson, Kinston, N. C.	*95.59	3.27	1.14
7042	do.	do.	Deans & Moye Co., Goldsboro, N. C.	*93.65	6.10	.22

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Per Cent of Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
6896	OATS ( <i>Cheat.</i> )	D. H. Dixon, Goldsboro, N. C.	Jeffreys & Sons, Goldsboro, N. C.	*91.89	8.08	.03	96.0
7011	do	do	T. W. Mawborne & Co., Kinston, N. C.	*91.13	8.87	-----	98.5
6895	do ( <i>Cheat.</i> )	do	H. Neil & Bros., Goldsboro, N. C.	*92.69	7.03	.28	93.5
7012	do	do	W. P. Thomas, Richlands, N. C.	*96.25	3.37	.18	95.0
7013	do	do	do	97.70	2.30	-----	98.0
7014	do ( <i>Cheat.</i> )	do	J. P. Walters, La Grange, N. C.	*96.79	2.58	.63	183.5
6787	do	Durham Seed House, Durham, N. C.	Apex Mule & Supply Co., Apex, N. C.	*95.91	3.69	.40	97.5
7106	do	Gillette Grain Co., Nashville, Tenn.	A. O. Beddard, Winterville, N. C.	*86.88	12.66	.46	94.0
7105	do ( <i>Cheat.</i> )	do	Allen Bennett, Polkton, N. C.	*95.67	4.09	.24	95.0
6890	do ( <i>Cheat.</i> )	do	L. H. Caldwell, Lumberton, N. C.	*97.16	2.47	.37	188.5
7038	do	J. R. Hales, Nashville, Tenn.	P. L. Woodard & Co., Wilson, N. C.	*91.83	7.03	1.14	98.0
7039	do	do	do	*88.72	11.14	.14	90.0
7044	do	Hall & Pearsall, Wilmington, N. C.	L. P. Best, Warsaw, N. C.	*97.19	2.60	.21	98.0
6892	do	do	Wallace Grocery Co., Wallace, N. C.	*97.31	2.25	.44	97.5
6994	do	Harris Grain Co., Nashville, Tenn.	D. C. McNeill, Laurinburg, N. C.	*95.48	4.07	.45	173.5
6904	do ( <i>Cheat.</i> )	E. G. Hines, Goldsboro, N. C.	Hobbs & Russ, Warsaw, N. C.	*91.56	4.97	3.47	98.0
6905	do ( <i>Cheat.</i> )	do	B. G. Thompson & Sons, Goldsboro, N. C.	*92.99	5.07	1.94	97.5
6903	do ( <i>Cheat.</i> )	do	Wilson & Hill, Warsaw, N. C.	*97.48	2.45	.07	97.5
7041	do	Chas. D. Jones, Nashville, Tenn.	N. B. Finch & Co., Zebulon, N. C.	*97.41	2.59	-----	100.0
6984	do	McNair & Pearsall, Wilmington, N. C.	Oscar High, Whiteville, N. C.	*95.72	3.71	.57	97.5

6891	do.	do.	Hoke Mercantile Co., Raeford, N. C.	*95.86	1.80	2.34	95.0
6899	do.	do.	Mayo Milling Co., Richmond, Va.	*95.68	4.10	.22	95.0
7015	do.	do.	do.	*94.97	4.97	.06	95.0
6814	do.	do.	do.	*91.24	4.02	1.74	90.0
6902	do.	do.	King Co-operative Co., Nashville, Tenn.	*86.45	2.74	10.81	†82.0
6901	do.	do.	do.	*94.47	4.00	1.53	†85.5
6900	do.	do.	McLauchlin Co., Raeford, N. C.	98.69	1.25	.06	†73.0
6815	do.	do.	P. A. Reavis & Co., Louisville, N. C.	*95.01	4.31	.68	†88.5
7124	do.	do.	Ricks, Allor-L. Batchelor Co., Nashville, N. C.	*79.76	20.24	-----	97.5
6892	do.	do.	Phillips-Patterson Co., Richmond, Va.	*95.77	4.03	.20	95.5
6910	do.	do.	W. F. Richardson, Jr. & Co., Richmond, Va.	*96.33	1.29	2.38	98.0
6909	do.	do.	do.	97.65	2.35	-----	94.0
7052	do.	do.	Roanoke Seed & Supply Co., Roanoke, Va.	*94.21	2.81	2.98	95.5
6792	do.	do.	Roper & Co., Petersburg, Va.	*90.09	6.79	3.12	97.0
6794	do.	do.	do.	97.70	1.78	.52	96.0
6788	do.	do.	Eugene Johnston, Littleton, N. C.	*96.68	3.08	.24	96.5
6789	do.	do.	do.	*97.26	2.54	.20	93.0
6795	do.	do.	Overton Kearney, Kittrell, N. C.	98.64	1.07	.29	98.0
6793	do.	do.	J. R. Pearce, Youngville, N. C.	99.48	.82	-----	92.5
6790	do.	do.	S. J. Stallings, Littleton, N. C.	*96.35	1.28	2.37	94.0
6791	do.	do.	do.	97.95	2.05	-----	91.0
6801	do.	do.	N. R. Savage & Son, Richmond, Va.	98.88	1.12	-----	93.0
7126	do.	do.	Byrd & Bryan, Durham, N. C.	*96.37	3.06	.17	90.0
7070	do.	do.	Carolina Warehouse Co., Greensboro, N. C.	*94.37	5.26	.37	97.0
7119	do.	do.	Graham Hardware Co., Graham, N. C.	97.73	2.19	.08	94.5

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Cent of Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
7069	OATS.....	N. R. Savage & Son, Richmond, Va.....	W. L. Klutz, Salisbury, N. C.....	*94.44	5.40	.16	98.0
7268	do..... ( <i>Cheat, corn cockle, wild garlic.</i> )	do.....	McKinn Bros., Louisville, N. C.....	*91.41	4.16	4.43	96.5
6802	do.....	do.....	do.....	*89.37	10.38	.25	95.0
7264	do.....	do.....	Mt. Airy Feed Store, Mt. Airy, N. C.....	*94.92	5.68		97.5
7265	do.....	do.....	do.....	*96.63	2.49	.88	97.5
6715	do.....	do.....	W. M. Neel & Co., Mooresville, N. C.....	*92.65	6.26	1.09	90.5
7167	do.....	do.....	S. L. Owen, Lexington, N. C.....	*96.87	2.91	.22	99.0
7267	do.....	do.....	C. B. Pettigrew, Reidsville, N. C.....	*94.71	1.57	3.72	97.5
6803	do.....	do.....	Geo. A. Rose & Co., Henderson, N. C.....	*97.22	1.71	1.07	97.5
7040	do..... ( <i>Cheat, wild garlic.</i> )	do.....	Selma Supply Co., Selma, N. C.....	*95.90	4.10		98.5
7266	do.....	do.....	Hugh Woods, Roxboro, N. C.....	*96.05	3.67	.88	93.5
6813	do..... ( <i>Cheat, corn cockle, wild gar lic.</i> )	Slate Seed Co., South Boston, Va.....	Moore Bros. & Co., Roxboro, N. C.....	*95.71	2.30	1.99	97.0
6812	do.....	do.....	L. G. Stanfield & Co., Roxboro, N. C.....	*88.15	11.73	.12	93.5
7118	do..... ( <i>Cheat.</i> )	Southern Distributing Co., Norfolk, Va.....	A. S. Roberson & Co., Robersonville, N. C.....	*95.37	3.40	1.53	†88.0
7009	do.....	do.....	W. S. White & Co., Elizabeth City, N. C.....	*94.86	5.67	.07	94.5
7253	do.....	W. R. Tate & Co., Nashville, Tenn.....	Wofford Fain Co., Murphy, N. C.....	95.01	1.71	.28	94.5
7000	do.....	do.....	J. B. Johnston, Greenville, N. C.....	*94.52	4.75	.73	93.5
6999	do.....	do.....	J. R. & J. C. Moye, Greenville, N. C.....	*93.71	6.20	.09	†83.5
7036	do..... ( <i>Cheat.</i> )	do.....	W. P. Surles, Dunn, N. C.....	*97.27	2.29	.44	99.0
7037	do.....	do.....	do.....	*95.09	4.46	.45	94.0



7122	do. ( <i>Cheat.</i> )	W. B. Wilson, Greenville, N. C.	H. G. Mumford & Co., Ayden, N. C.	*97.09	2.40	.49	93.0
7045	do.	Wilson & Hill, Warsaw, N. C.	M. S. Merritt, Clinton, N. C.	*94.54	5.37	.09	97.0
6719	do.	T. W. Wood & Sons, Richmond, Va.	Carolina Warehouse Co., Greensboro, N. C.	*99.22	.57	.21	97.5
6720	do. ( <i>Cheat.</i> )	do.	do.	*93.21	5.62	1.17	100.0
7261	do.	do.	Chautauqua Drug Co., Waynesville, N. C.	*97.26	2.64	.10	99.0
6879	do.	do.	E. N. Covington & Co., Rockingham, N. C.	98.62	.37	1.01	94.5
7007	( <i>Cheat, corn cockle, wild garlic.</i> )	do.	A. J. Cox & Co., Washington, N. C.	98.53	1.35	.12	99.0
7006	do.	do.	do.	93.15	1.74	.11	92.5
7005	do.	do.	Walter Credle & Co., Washington, N. C.	*95.24	4.54	.22	97.0
6721	do.	do.	A. S. Dayvault, Concord, N. C.	*97.00	2.96	.03	95.5
6986	do.	do.	C. Harrell & Son, Burgaw, N. C.	98.40	1.50	.10	90.5
6716	do.	do.	Harris & McNeely Co., Mooresville, N. C.	98.53	.93	.49	93.5
7260	do. ( <i>Cheat.</i> )	do.	Hazell & Mims, Reidsville, N. C.	98.61	.39	1.00	96.0
6985	do.	do.	Oscar High, Whiteville, N. C.	*96.08	3.55	.37	99.0
6880	do.	do.	W. D. Holland, Dunn, N. C.	98.74	.49	.77	97.0
6881	do. ( <i>Cheat.</i> )	do.	do.	99.04	.82	.14	98.0
6811	do. ( <i>Cheat, corn cockle.</i> )	do.	A. B. Hunter, Apex, N. C.	98.52	.32	1.16	94.5
6786	do.	do.	do.	*90.85	9.01	.14	93.0
6884	do.	do.	A. S. Huske, Fayetteville, N. C.	*90.37	9.04	.59	94.0
6883	do.	do.	do.	*95.32	4.67	.01	180.0
6987	do.	do.	do.	97.67	1.62	.71	98.0
6886	do.	do.	J. B. Johnston, Greenville, N. C.	*96.62	3.38	-----	99.0
6885	do.	do.	do.	98.36	1.44	.20	99.5
7001	do.	do.	do.	98.85	1.15	-----	99.0
7032	do. ( <i>Cheat, corn cockle.</i> )	do.	J. E. Jordan, Dunn, N. C.	*97.36	1.35	1.29	98.5
6882	do. ( <i>Corn cockle.</i> )	do.	do.	*97.14	2.02	.84	93.5

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Cent of Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
6887	OATS.....	T. W. Wood & Sons, Richmond, Va. ....	H. C. Joyner, Rocky Mount, N. C. ....	98.74	1.26	.....	94.5
6889	do.....	do.....	W. D. Kelly, Clinton, N. C. ....	98.55	1.31	.14	98.5
6722	do.....	do.....	E. L. Kiser, Rural Hall, N. C. ....	98.00	.92	1.08	97.0
6809	(Corn cockle, cheat.)	do.....	Lee Store Co., Sanford, N. C. ....	*86.65	12.90	.45	96.5
7072	(Corn cockle.)	do.....	Lincoln Farmers Union Warehouse Co., Lincolnton, N. C. ....	*97.44	1.74	.82	98.5
7166	do.....	do.....	Morrow Bros. & Heath Co., Albemarle, N. C. ....	98.01	1.99	.....	96.0
7115	do.....	do.....	J. E. R. Perry & Co., Windsor, N. C. ....	*96.54	2.97	.49	95.0
7031	do.....	do.....	B. F. Powell, Clinton, N. C. ....	*97.40	2.16	.44	98.5
6888	(Wheat.)	do.....	do.....	*95.76	4.24	.....	98.5
7117	do.....	do.....	Powell, Landis Co., Henderson, N. C. ....	*93.05	6.95	.....	98.5
7262	do.....	do.....	J. H. Roberson & Co., Robersonville, N. C. ....	*94.49	4.61	.90	97.0
7116	do.....	do.....	M. S. Schultz, Greensboro, N. C. ....	*96.43	3.03	.54	99.0
6890	do.....	do.....	Sinclair Bros., Carthage, N. C. ....	*96.54	3.46	.....	94.0
6723	do.....	do.....	S. W. Y. Supply Co., Elkin, N. C. ....	98.29	1.71	.....	94.0
7003	do.....	do.....	L. T. Thompson, Aurora, N. C. ....	97.70	1.71	.56	98.5
7002	(Wheat.)	do.....	do.....	*95.71	3.98	.31	96.5
6717	do.....	do.....	Tucker & Erwin, Greensboro, N. C. ....	99.58	.42	.....	98.0
6718	do.....	do.....	do.....	97.83	.99	1.18	99.0
6580	(Wheat, corn cockle.)	do.....	W. S. White & Co., Elizabeth City, N. C. ....	98.85	.92	.23	94.0
	(Wild garlic.)	do.....					

7004	do.....	E. K. Willis, Washington, N. C.....	*96.78	2.80	.42	97.0
6810	do.....	B. B. Woodlief, Kittrell, N. C.....	97.99	2.01	-----	97.0
6991	do.....	Not known.....	97.53	2.47	-----	92.5
6911	do.....	R. D. Caldwell & Son, Lumberton, N. C.....	*97.26	2.74	-----	98.5
6913	do.....	D. L. Gore, Wilson, N. C.....	*96.95	2.43	.42	99.0
6912	do.....	do.....	*96.42	3.26	.32	96.5
6816	do.....	Texas grown.....	*94.27	5.15	.58	98.5
6817	do.....	Durham Seed House, Durham, N. C.....	*96.66	2.89	.45	96.5
6657	do.....	do.....	97.56	1.60	.84	97.5
6658	do.....	Home grown seed.....	*96.61	2.71	.68	98.5
6658	do.....	Tennessee grown.....	*89.86	10.14	-----	98.0
7043	do.....	Not known.....	-----	-----	-----	97.5
7030	do.....	Wilson & Hill, Warsaw, N. C.....	-----	-----	-----	92.0
6938	do.....	W. R. Kelly, Dover, N. C.....	99.40	.60	-----	99.0
7051	do.....	Ray Dawson, Kinston, N. C.....	99.75	.21	.04	158.0
6648	do.....	Deans & Moye Co., Goldsboro, N. C.....	98.98	1.02	-----	155.0
6939	do.....	Harrison & Co., Lenoir, N. C.....	99.57	.43	-----	94.5
7295	do.....	Hobbs & Russ, Warsaw, N. C.....	99.63	.32	-----	140.0
6941	do.....	E. O. McGowan, Elm City, N. C.....	98.99	1.01	-----	89.5
6940	do.....	Wallace Grocery Co., Wallace, N. C.....	*98.10	1.90	-----	169.0
6650	do.....	Wilson & Hill, Warsaw, N. C.....	98.87	.61	.49	99.5
7145	do.....	Hickory Seed Co., Hickory, N. C.....	*98.09	1.91	-----	179.5
7022	do.....	R. E. L. Cook, Tarboro, N. C.....	99.73	.27	-----	174.5
7297	do.....	C. B. Hill, New Bern, N. C.....	99.85	.15	-----	87.5
7058	do.....	Iredell Feed & Seed Store, Statesville, N. C.....	99.69	.31	-----	182.0
6944	do.....	W. A. Myatt, Raleigh, N. C.....	99.08	.92	-----	95.0
7146	do.....	J. D. Winstead, Nashville, N. C.....	99.25	.75	-----	-----
	do.....	Durham Seed House, Durham, N. C.....	-----	-----	-----	-----

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed Per Cent of	Inert Matter Per Cent of	Foreign Seed Per Cent of	Per Cent of Germination
6774	RAPE	Diggs & Beadles, Richmond, Va.	Farmers Supply Co., Charlotte, N. C.	99.10	.90	---	184.0
7296	do	do	Farmers Union Agency Co., Winston-Salem, N. C.	99.88	.12	---	98.0
69431	do	do	Jeffreys & Sons, Goldsboro, N. C.	---	---	---	---
7144	do	D. M. Ferry & Co., Detroit, Mich.	M. S. Schultz, Greenville, N. C.	99.44	.27	.29	96.0
7087	do	Philadelphia Seed Co., Philadelphia, Pa.	J. E. Sloop, Statesville, N. C.	99.78	.22	---	96.0
7143	do	J. B. Rice Seed Co., Cambridge, N. Y.	W. W. Parker, Henderson, N. C.	99.58	.42	---	185.0
6653	do	N. R. Savage & Son, Richmond, Va.	City Feed Co., Hickory, N. C.	99.48	.52	---	90.5
6773	do	Wm. G. Scarlett & Co., Baltimore, Md.	C. Scott & Co., Greensboro, N. C.	99.06	.44	.50	181.5
6942	do	Slate Seed Co., South Boston, Va.	A. S. Huske, Fayetteville, N. C.	99.27	.73	---	182.5
6862	do	Thalman & Co., New York, N. Y.	Durham Seed House, Durham, N. C.	99.24	.76	---	188.5
7299	do	T. W. Wood & Son, Richmond, Va.	J. J. Adams, Winston-Salem, N. C.	99.46	.22	.32	99.5
7086	do	do	Boyd Feed Co., Hickory, N. C.	99.69	.23	.08	96.0
6948	do	do	L. H. Caldwell, Lumberton, N. C.	99.41	.56	.03	185.5
6772	do	do	Carolina Warehouse Co., Greensboro, N. C.	99.19	.67	.14	166.0
6768	do	do	Cline & Moose, Concord, N. C.	99.52	.43	.05	170.0
6953	do	do	R. E. L. Cook, Tarboro, N. C.	99.09	.87	.04	93.0
6950	do	do	E. N. Covington & Co., Rockingham, N. C.	98.69	1.31	---	97.0
7142	do	do	R. L. Davis & Bro., Farmville, N. C.	99.48	.27	.25	99.5
7140	do	do	Five Points Drug Co., Durham, N. C.	99.13	.87	---	95.5

7085	do	Gaston Seed & Provision Co., Gastonia, N. C.	99.86	.10	.04	98.5
7017	do	W. P. Hardy, La Grange, N. C.	99.87	.13	-----	99.5
7141	do	J. H. Harris, Farmville, N. C.	99.87	.13	-----	100.0
6955	do	Doane Herring, Wilson, N. C.	*93.41	1.59	-----	96.0
7021	do	J. E. Hood & Co., Kinston, N. C.	99.66	.30	.04	95.0
6949	do	do	99.15	.71	.14	†80.5
7016	do	Isler & Peele, La Grange, N. C.	99.77	.20	.03	95.5
6954	do	J. B. Johnston, Greenville, N. C.	99.63	.37	-----	92.5
7298	do	D. J. Kimball, Statesville, N. C.	99.82	.18	-----	94.0
6649	do	Kiser & Mauney, Kings Mountain, N. C.	99.47	.41	.12	†78.5
6952	do	McLaughlin Co., Raeford, N. C.	99.84	.16	-----	95.0
7039	do	McPherson Drug Co., Lillington, N. C.	97.50	1.32	.18	97.5
7020	do	E. B. Marston Drug Co., Kinston, N. C.	99.68	.27	.05	97.5
7019	do	T. W. Mewborne & Co., Kinston, N. C.	99.48	.50	.02	83.5
6946	do	D. M. Partrick & Co., Clinton, N. C.	*98.32	1.64	.04	92.0
6945	do	B. F. Powell, Clinton, N. C.	98.79	1.21	-----	94.5
7018	do	H. C. Prevatt, Edenton, N. C.	99.49	.49	.02	74.5
6771	do	M. C. Ruffy, Salisbury, N. C.	99.77	.23	-----	97.0
6770	do	Union Warehouse & Trading Co., Salisbury, N. C.	99.35	.62	.03	†63.5
6951	do	Watson-King Co., Rockingham, N. C.	98.68	1.27	.05	95.0
6769	do	White-Morrison-Flove Co., Concord, N. C.	99.23	.50	.27	94.0
6947	do	J. V. Williamson, Carthage, N. C.	99.41	.44	.15	†71.0
7023	do	(Corn cockle.)	99.95	.05	-----	93.5
6651	do	Wood, Stubbs & Co., Louisville, Ky.	99.44	.40	.16	†88.0
6652	do	Imported seed	*97.61	.77	1.62	†74.0
	do	L. R. Stricker, Asheville, N. C.				

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 747 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed Per Cent of	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
6635	Redtop	C. S. Brent, Lexington, Ky.	City Feed Co., Hickory, N. C.	*66.60	31.23	2.17	75.5
7165	do.	Louisville Seed Co., Louisville, Ky.	Byers Bros., Hendersonville, N. C.	*55.12	10.02	34.26	91.8
7079	do.	do.	Harrison & Co., Lenoir, N. C.	92.12	6.40	1.48	93.3
6636	do.	do.	Hickory Seed Co., Hickory, N. C.	*65.60	25.68	8.72	83.5
7395	do.	do.	do.	*76.79	15.09	8.12	85.8
6634	do.	N. R. Savage & Son, Richmond, Va.	Fairmount Grocery Co., Elkin, N. C.	*71.27	23.48	2.25	80.7
7080	do.	Wm. G. Scarlett & Co., Baltimore, Md.	Scott Seed Co., Greensboro, N. C.	*40.61	50.25	9.14	71.8
6983	do.	Smith Seed & Feed Co., Danville, Va.	R. M. Gillie, Reidsville, N. C.	*79.32	13.46	7.22	74.5
6749	do.	T. W. Wood & Sons, Richmond, Va.	Carolina Warehouse Co., Greensboro, N. C.	90.71	8.92	1.27	94.5
6750	do.	do.	Farmers Union Agency Co., Winston-Salem, N. C.	89.88	7.96	2.16	95.0
7081	do.	do.	Gaston Seed & Provision Co., Gastonia, N. C.	*87.98	9.48	2.54	87.0
6637	do.	do.	do.	90.84	7.36	1.80	89.0
6748	do.	do.	Miller-McLain Supply Co., Statesville, N. C.	*79.63	19.98	.39	90.0
7304	do.	do.	R. L. Snelson & Co., Bryson City, N. C.	91.56	6.89	1.55	89.5
6751	do.	do.	Union Warehouse & Trading Co., Salisbury, N. C.	*85.19	13.06	1.75	79.5
6875	do.	do.	W. P. Ware, Reidsville, N. C.	*75.95	14.41	9.61	89.0
7164	do.	Imported seed	Grant's Pharmacy, Asheville, N. C.	92.40	6.64	.96	91.5
6634	do.	Kentucky seed	T. S. Morrison & Co., Asheville, N. C.	*69.64	21.04	9.32	85.3

7306	do	Imported seed	L. R. Stricker, Asheville, N. C.	96.26	3.54	.20	90.0
5777	RYE ( <i>Cheat, corn cockle.</i> )	Adams Grain & Provision Co., Charlotte, N. C.	Farmers Union Agency Co., Winston-Salem, N. C.	*95.01	3.32	1.67	91.5
6925	do	do	Parris, Goodwin Co., Benson, N. C.	98.00	1.40	.60	†81.5
6853	do	do	P. A. Reavis & Co., Louisburg, N. C.	*90.35	7.81	1.24	†86.5
6916	( <i>Cheat</i> )	S. T. Beveridge & Co., Richmond, Va.	Ray Dawson, Kiuston, N. C.	*95.33	4.30	.37	90.5
6915	( <i>Cheat</i> )	do	Deans & Moye Co., Goldsboro, N. C.	*96.18	3.05	.77	†87.5
6917	( <i>Cheat</i> )	do	J. T. Edgerton & Bro., Keady, N. C.	*95.59	2.36	2.05	†80.0
6914	( <i>Cheat</i> )	do	P. G. A. Tart, Dunn, N. C.	*95.76	2.57	1.67	†65.5
6847	( <i>Cheat</i> )	do	Winston-Blanks Drug Co., Youngsville, N. C.	*94.10	4.71	1.19	†81.0
6579	do	Carter, Venable & Co., Richmond, Va.	C. B. Hill, New Bern N. C.	*94.90	4.62	.48	†82.0
6918	( <i>Cheat, corn cockle, wild garlic.</i> )	do	R. B. Peters, Tarboro, N. C.	*96.71	2.86	.43	†83.5
6848	( <i>Cheat</i> )	Diggs & Beadles, Richmond, Va.	Byrd & Bryan, Durham, N. C.	*94.60	4.79	.61	†88.0
6926	do	do	Hadley, Harris & Co., Wilson, N. C.	*96.48	3.27	.25	90.5
6919	do	Mayo Milling Co., Richmond, Va.	W. S. Clarke & Sons, Tarboro, N. C.	*96.19	3.30	.51	93.0
6924	do	W. F. Richardson, Jr. & Co., Richmond, Va.	L. H. Caldwell, Lumberton, N. C.	*96.76	3.08	.16	92.0
6845	do	Roper & Co., Petersburg, Va.	Crutup-Kittrell Co., Kittrell, N. C.	98.52	1.42	.06	94.0
6846	( <i>Cheat</i> )	do	C. S. Williams, Franklinton, N. C.	*94.63	4.72	.60	†80.0
6654	do	N. R. Savage & Son, Richmond, Va.	Gaston Seed & Provision Co., Gastonia, N. C.	*95.48	4.05	.47	†73.0
6850	do	do	Lyon-Winston Co., Oxford, N. C.	*96.61	2.89	.47	94.5
6851	do	do	L. Thomas, Oxford, N. C.	*95.91	3.55	.54	90.0
6852	do	do	Hugh Woods, Roxboro, N. C.	*95.45	2.53	2.02	90.0
6778	( <i>Cheat</i> )	Wm. G. Scarlett & Co., Baltimore, Md.	H. E. Kendall, Shelby, N. C.	98.53	.73	.74	89.5
6775	( <i>Corn cockle, wild garlic.</i> )	T. W. Wood & Sons, Richmond, Va.	Carolina Warehouse Co., Greensboro, N. C.	*95.69	3.90	.41	90.5

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Per Cent of Pure Seed	Per Cent of Inert Matter	Per Cent of Foreign Seed	Per Cent of Germination
6656	RYE..... ( <i>Cheat.</i> )	T. W. Wood & Sons, Richmond, Va.	Grant's Pharmacy, Asheville, N. C.	*95.77	3.36	.87	178.0
6854	do.....	do.	T. E. Holding & Co., Wake Forest, N. C.	*96.33	3.14	.53	185.0
6923	do..... ( <i>Cheat.</i> )	do.	Jas. E. Jordan, Dunn, N. C.	97.70	2.03	.27	95.5
6921	do..... ( <i>Cheat.</i> )	do.	B. F. Powell, Clinton, N. C.	*91.62	4.01	4.37	168.5
6920	do..... ( <i>Wild garlic.</i> )	do.	F. N. Rhodes, Hamlet, N. C.	97.66	1.98	.36	98.0
6922	do.....	do.	W. A. Roberson & Co., Robersonville, N. C.	*92.58	5.39	2.03	188.0
6855	do..... ( <i>Cheat.</i> )	do.	Geo. A. Rose & Co., Henderson, N. C.	*94.76	3.39	1.85	185.5
6776	do..... ( <i>Cheat.</i> )	do.	Tucker & Erwin, Greensboro, N. C.	*95.25	4.11	.64	185.5
6849	do..... ( <i>Cheat.</i> )	Not known.	Durham Seed House, Durham, N. C.	*96.50	3.17	.03	93.5
6655	do..... ( <i>Cheat.</i> )	Home grown seed.	L. R. Stricker, Asheville, N. C.	99.29	.50	.21	92.0
7244	Timothy.....	Baldwin Feed Co., Johnson City, Tenn.	Baker Bros., Bakersville, N. C.	99.30	.55	.15	92.3
7245	do.....	do.	J. R. Garvin, Toecane, N. C.	99.21	.64	.15	93.8
7243	do.....	do.	Spruce Pine Store Co., Spruce Pine, N. C.	98.62	.69	.69	† 3.8
6625	do.....	S. T. Beveridge & Co., Richmond, Va.	J. H. Dittmore, Bryson City, N. C.	99.26	.49	.25	86.0
6626	do.....	do.	Harrison & Co., Lenoir, N. C.	99.29	.47	.24	84.5
7241	do.....	J. Belgiano & Son, Baltimore, Md.	J. E. Sloop, Statesville, N. C.	98.93	.34	.73	97.5
6865	do.....	do.	H. W. & J. C. Webb, Hillsboro, N. C.	98.92	.49	.59	176.3
7242	do.....	J. J. Buffington & Co., Baltimore, Md.	T. D. Meador Grocery Co., Madison, N. C.	*95.20	.34	4.46	94.0
7229	do.....	Hackney, Broyles & Lackey Co., Knoxville, Tenn.	W. W. Lineback Hardware Co., Elk Park, N. C.	98.17	.25	1.58	83.5



6629	do.	Hardin, Hamilton & Lewman, Louisville, Ky.	Boyd Feed Co., Hickory, N. C.	97.17	1.57	1.26	479.9
6630	do.	do.	City Feed Co., Hickory, N. C.	*94.21	2.88	2.88	87.9
6628	do.	do.	John E. Fain, Murphy, N. C.	97.36	1.44	1.20	*77.5
7234	do.	do.	do.	98.57	.94	.49	92.8
7235	do.	do.	Gaston & Tate, Marion, N. C.	97.47	1.07	1.46	464.5
7184	do.	do.	W. J. Gudger & Sons, Louisville, Ky.	98.67	.35	.98	92.3
6761	do.	do.	C. Scott & Co., Greensboro, N. C.	98.80	.55	.65	84.5
6627	do.	National Seed Co., Louisville, Ky.	Slayden, Fakes & Co., Asheville, N. C.	97.25	1.64	1.11	91.3
6763	do.	N. R. Savage & Son, Richmond, Va.	Clarence Call, N. Wilkesboro, N. C.	98.65	.72	.63	84.5
7231	do.	do.	D. J. Cockerham & Son, Elkin, N. C.	97.56	1.69	.75	93.0
6762	do.	do.	Davidson & Wolfe, Charlotte, N. C.	98.26	1.13	.61	464.5
6764	do.	do.	Fairmount Grocery Co., Elkin, N. C.	98.93	.63	.44	480.5
6867	do.	do.	Hazell & Mims, Reidsville, N. C.	98.91	.68	1.31	90.8
7232	do.	do.	W. E. Merritt & Co., Mt. Airy, N. C.	98.36	.82	.82	92.3
7233	do.	do.	Mt. Airy, Feed Store, Mt. Airy, N. C.	97.64	1.33	1.03	92.3
6866	do.	do.	Wilkins-Ricks & Co., Sanford, N. C.	98.54	.91	.55	86.3
7230	do.	Slayden, Fakes & Co., Asheville, N. C.	D. K. Collins, Cherokee, N. C.	98.62	.54	.84	469.8
6631	do.	L. R. Stricker, Asheville, N. C.	Farmers Union Warehouse, Marshall, N. C.	99.43	.38	.19	88.8
7228	do.	do.	J. W. Jones, Canton, N. C.	98.48	.49	1.03	93.5
7236	do.	T. W. Wood & Sons, Richmond, Va.	J. D. Blanton, Marion, N. C.	98.62	.54	.84	91.8
7239	do.	do.	Holmes Bryson, Dillsboro, N. C.	98.54	.78	.68	469.8
7240	do.	do.	Sam T. Davis, Winston-Salem, N. C.	96.55	.34	3.11	92.5
6767	do.	do.	Farmers Union Agency Co., Winston-Salem, N. C.	96.26	.76	2.98	465.5
6766	do.	do.	Harris & McNeely Co., Mooresville, N. C.	98.11	1.26	.63	421.3
7237	do.	do.	Joyce Jones & Co., Walnut Cove, N. C.	98.55	.45	1.00	84.5

TABLE XII.—RESULTS OF TESTS OF 27 KINDS OF AGRICULTURAL SEEDS, 746 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915—CONTINUED.

Laboratory Number	Kind of Seed and Name of Unlawful Seed Present	Wholesale Dealer	Retail Dealer	Pure Seed of Per Cent of	Per Cent of Inert Matter	Per Cent of Foreign Seed	Germination of
6765	TIMOTHY.....	T. W. Wood & Sons, Richmond, Va.....	W. L. Klutts, Salisbury, N. C.....	98.97	.49	.54	478.0
7238	do.....	do.....	R. L. Snelson & Co., Bryson City, N. C.....	98.83	.33	.81	482.8
6980	do.....	do.....	B. H. B. Vestor, Nashville, N. C.....	98.49	.97	.54	433.0
7185	do.....	Imported seed.....	T. S. Morrison & Co., Asheville, N. C.....	98.61	1.11	.28	492.3
6632	do.....	Kentucky grown.....	do.....	98.61	.43	.96	485.3
6633	do.....	American grown.....	L. R. Stricker, Asheville, N. C.....	97.59	1.04	1.46	499.5
7227	do.....	Not known.....	do.....	99.40	.20	.40	492.5
6871	VETCH, WINTER.....	S. T. Beveridge & Co., Richmond, Va.....	H. L. Parrish, Hillsboro, N. C.....	98.86	1.14	.....	35.5
6971	do.....	Carter, Venable & Co., Richmond, Va.....	Hadley, Harris & Co., Wilson, N. C.....	99.43	.27	.30	26.5
7313	(Corn cockle.).....	do.....	Iredell Feed & Seed Store, Statesville, N. C.....	98.94	.99	.07	2.0
6970	do.....	do.....	J. C. Peterson, Clinton, N. C.....	99.80	.15	.05	32.5
6972	(Corn cockle.).....	do.....	J. D. Winstead, Nashville, N. C.....	99.07	.50	.13	22.5
6872	(Corn cockle.).....	do.....	M. Dorsey, Henderson, N. C.....	100.00	.....	.....	28.5
6746	do.....	Diggs & Beadles, Richmond, Va.....	Clarence Call, N. Wilkesboro, N. C.....	99.25	.52	.23	48.5
6747	(Corn cockle.).....	do.....	Davidson & Wolfe, Charlotte, N. C.....	99.60	.25	.15	24.0
6745	do.....	Wm. G. Scarlett & Co., Baltimore, Md.....	C. Scott & Co., Greensboro, N. C.....	99.14	.46	.40	39.0
6973	(Corn cockle.).....	do.....	L. H. Caldwell, Lumberton, N. C.....	97.56	2.24	.20	38.0
6744	do.....	T. W. Wood & Sons, Richmond, Va.....	Carolina Warehouse Co., Greensboro, N. C.....	97.48	.34	.18	24.0
6739	(Corn cockle.).....	do.....	Cline & Moose, Concord, N. C.....	99.43	.40	.17	36.5
6737	(Corn cockle.).....	do.....	Farmers Supply Co., Charlotte, N. C.....	99.62	.34	.04	27.5

6735	do.....do.....	Farmers Union Agency Co., Winston-Salem, N. C.....	99.49	.57	39.0
6647	do.....do..... (Corn cockle.)	Gaston Seed & Provision Co., Gastonia, N. C.....	99.81	.14	17.0
7153	do.....do.....	Jos. A. Isely & Bro. Co., Burlington, N. C.....	99.69	.19	7.0
6741	do.....do.....	H. E. Kendall, Shelby, N. C.....	99.81	.19	26.0
6738	do.....do..... (Corn cockle.)	H. N. Johnston & Co., Mooresville, N. C.....	99.81	.12	30.5
6736	do.....do..... (Corn cockle.)	Lowling & Costner, Lincolnton, N. C.....	99.65	.30	6.5
6975	do.....do..... (Corn cockle.)	B. F. Powell, Clinton, N. C.....	99.46	.40	28.0
6742	do.....do..... (Corn cockle.)	M. C. Ruffy, Salisbury, N. C.....	99.73	.18	14.0
6743	do.....do..... (Corn cockle.)	Union Warehouse & Trading Co., Salisbury, N. C.....	99.09	.52	39.5
6873	do.....do..... (Corn cockle.)	W. P. Ware, Reidsville, N. C.....	99.69	.10	38.5
6740	do.....do.....	White-Morrison-Flowe Co., Concord, N. C.....	99.29	.61	28.5
6974	do.....do.....	J. V. Williamson, Carthage, N. C.....	100.00	-----	33.0
6936	WHEAT.....	J. T. Edgerton & Bro., Kenly, N. C.....	98.15	1.83	785.0
6937	do.....do.....	McLauchlin Co., Raeford, N. C.....	*95.45	4.55	788.5
6927	do.....do..... (Corn cockle.)	A. S. Huske, Fayetteville, N. C.....	99.69	.25	95.0
6876	do.....do.....	S. J. Stallings, Littleton, N. C.....	99.40	.23	769.0
6932	do.....do.....	L. H. Caldwell, Lumberton, N. C.....	99.06	.79	783.0
6931	do.....do.....	E. N. Covington & Co., Rockingham, N. C.....	99.77	.23	93.5
6934	do.....do.....	Hadley, Harris & Co., Wilson, N. C.....	99.56	.44	95.0
6935	do.....do..... (Corn cockle.)	J. B. Johnston, Greenville, N. C.....	98.93	.97	92.0
6930	do.....do.....	Jas. E. Jordan, Dunn, N. C.....	99.62	.38	96.5
6929	do.....do.....	H. C. Joyner, Rocky Mount, N. C.....	99.55	.45	90.0
6933	do.....do.....	W. D. Kelly, Clinton, N. C.....	99.33	.47	90.5
6928	do.....do.....	McNeill Milling Co., Fayetteville, N. C.....	98.87	1.13	93.0

\*Below standard for purity. †Below standard for germination. ‡Sample examined for unlawful seeds; too weevil-eaten to make regular test.



[illegible]

TABLE XIV.—THE ADULTERATION OF AGRICULTURAL SEEDS.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Adulterant	Per Cent of Adulteration
6587	CRIMSON CLOVER.....	S. T. Beverage & Co., Richmond, Va.....	Harrison & Co., Lenoir, N. C.....	Alfalfa.....	7
6973	HAIKY VETCH.....	T. W. Wood & Sons, Richmond, Va.....	L. H. Caldwell, Lumberton, N. C.....	Spring Vetch.....	63
7066	RED CLOVER.....	Louisville Seed Co., Louisville, Ky.....	Harrison & Co., Lenoir, N. C.....	Alsike Clover.....	8
6634	REDTOP.....	Dealer not given.....	T. S. Morrison & Co., Charlotte, N. C.....	Timothy.....	6
6875	do.....	T. W. Wood & Sons, Richmond, Va.....	W. P. Ware, Reidsville, N. C.....	do.....	7
6983	do.....	Smith Seed & Feed Co., Danville, Va.....	R. M. Gillie, Reidsville, N. C.....	do.....	6
7080	do.....	Wm. G. Scarlett & Co., Baltimore, Md.....	Scott Seed Co., Greensboro, N. C.....	do.....	9
7165	do.....	Louisville Seed Co., Louisville, Ky.....	Byers Bros., Hendersonville, N. C.....	do.....	26
7305	do.....	do.....	Hickory Seed Co., Hickory, N. C.....	do.....	6
6640	TALL OAT GRASS.....	L. R. Stricker & Co., Asheville, N. C.....	Sylva Supply Co., Sylva, N. C.....	Orchard Grass.....	8
6609	WHITE CLOVER.....	Home-grown Seed.....	Hickory Seed Co., Hickory, N. C.....	Red Clover.....	9

NOTE.—The above table shows 11 cases of adulteration which were found in the 746 agricultural seed samples collected by inspectors. No case is reported where an adulterant was not present to the amount of five (5) per cent.

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914 TO JULY 15, 1915.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4238	BEANS	W. W. Barnard Co., Chicago, Ill.	W. J. Kirkham & Co., Wilmington, N. C.	96.0
4493	do.	J. Bolgiano & Son, Baltimore, Md.	H. E. Wilkinson Co., Mebane, N. C.	100.0
4465	do.	Robert Buist Co., Philadelphia, Pa.	J. G. Hall, Oxford, N. C.	100.0
4420	do.	do.	Tuckers Drug Store, Reidsville, N. C.	98.0
4619	do.	do.	do.	100.0
4618	do.	do.	do.	78.0
4587	do.	do.	Cabarrus Drug Co., Concord, N. C.	98.0
4496	do.	do.	R. E. L. Cook, Tarboro, N. C.	94.0
4464	do.	do.	J. G. Hall, Oxford, N. C.	100.0
4463	do.	do.	do.	89.0
4462	do.	do.	do.	99.0
4461	do.	do.	R. E. L. Cook, Tarboro, N. C.	80.0
4460	do.	do.	do.	98.0
4459	do.	do.	do.	94.0
4446	do.	do.	Fox & Lyon, Wadesboro, N. C.	100.0
4412	do.	do.	Job P. Wyatt's Sons Co., Raleigh, N. C.	20.0
4332	do.	do.	Henry Dunn, Kinston, N. C.	99.0
4331	do.	do.	Blount Pharmacy, Washington, N. C.	62.0
240	do.	Everett B. Clarke Seed Co., Milford, Conn.	A. S. Huske, Fayetteville, N. C.	100.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4621	BEANS.....	Crosman Bros. Co., Rochester, N. Y.	W. P. Ware, Raidsville, N. C.	88.0
4622	do.....	do.....	do.....	99.0
4327	do.....	D. M. Ferry & Co., Detroit, Mich.	J. C. Spruill, Plymouth, N. C.	100.0
4328	do.....	do.....	do.....	97.0
4343	do.....	do.....	do.....	92.0
4484	do.....	do.....	M. S. Schultz, Greenville, N. C.	100.0
4485	do.....	do.....	do.....	99.0
4486	do.....	do.....	do.....	96.0
4588	do.....	do.....	P. F. Newton & Co., Morganton, N. C.	99.0
4536	do.....	Lake Shore Seed Co., Dunkirk, N. Y.	Cummings Grocery Co., Tarboro, N. C.	98.0
4532	do.....	do.....	W. J. Hodges, Williamston, N. C.	38.0
4311	do.....	do.....	H. E. Daugherty, Dover, N. C.	64.0
4307	do.....	do.....	H. H. Satterthwaite, Washington, N. C.	100.0
4303	do.....	do.....	Floyd Barwick, LaGrange, N. C.	88.0
4299	do.....	do.....	J. F. Clarke, New Bern, N. C.	98.0
4471	do.....	D. Landreth Seed Co., Bristol, Pa.	Thomas Bros., Henderson, N. C.	92.0
4600	do.....	do.....	Sherrill & Reece, Statesville, N. C.	100.0
4599	do.....	do.....	do.....	96.0
4598	do.....	do.....	do.....	98.0



4586	do	Grant's Pharmacy, Asheville, N. C.	100.0
4472	do	Durham Seed House, Durham, N. C.	53.0
4470	do	Thomas Bros., Henderson, N. C.	100.0
4469	do	Hamilton Drug Co., Oxford, N. C.	92.0
4468	do	do	99.0
4467	do	E. A. Rosemond, Hillsboro, N. C.	94.0
4466	do	do	88.0
4442	do	T. W. Kendrick, Charlotte, N. C.	100.0
4441	do	Landreth Drug Co., Monro, N. C.	95.5
4440	do	Matthews Drug Co., Matthews, N. C.	100.0
4439	do	do	99.0
4418	do	Sherrill & Reece, Statesville, N. C.	100.0
4417	do	Carolina Warehouse, Greensboro, N. C.	98.0
4416	do	Gaston Seed & Provision Co., Gastonia, N. C.	94.0
4407	do	J. H. Monger, Sanford, N. C.	88.0
4320	do	J. F. Clarke, New Bern, N. C.	100.0
4319	do	Henry Dunn, Kingston, N. C.	94.0
4318	do	Beaufort Drug Co., Beaufort, N. C.	96.0
4317	do	do	92.0
4316	do	do	99.0
4597	Leonard Seed Co., Chicago, Ill.	Sherrill & Reece, Statesville, N. C.	97.0
4491	do	W. A. Mabry, Durham, N. C.	85.0
4490	do	do	99.0
4489	do	do	88.0
4386	do	J. H. Pate, Goldsboro, N. C.	97.0
4385	do	T. N. Waters & Bros., Goldsboro, N. C.	98.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4334	BEANS	Leonard Seed Co., Chicago, Ill.	Ruffin-Iligh Co., Wilson, N. C.	77.0
4339	do.	do.	Chas. B. Hill, New Bern, N. C.	36.0
4338	do.	do.	J. H. Potter, Jr., Beaufort, N. C.	98.0
4337	do.	do.	do.	100.0
4336	do.	do.	Temple Drug Co., Kinston, N. C.	96.0
4335	do.	do.	do.	66.0
4334	do.	do.	do.	86.0
4333	do.	do.	do.	98.0
4239	do.	do.	R. R. Bellamy, Wilmington, N. C.	99.0
4591	do.	J. B. Rice Seed Co., Cambridge, N. Y.	Leslie's Drug Store, Morganton, N. C.	88.0
4590	do.	do.	do.	98.0
4589	do.	do.	do.	100.0
4595	do.	do.	W. W. Parker, Henderson, N. C.	100.0
4494	do.	do.	W. A. Mabry, Durham, N. C.	97.0
4488	do.	do.	W. W. Parker, Henderson, N. C.	100.0
4487	do.	do.	do.	97.0
4409	do.	do.	S. J. Adams, Raleigh, N. C.	87.0
4383	do.	do.	B. F. Powell, Clinton, N. C.	100.0
4330	do.	do.	Worthy & Ethredge, Washington, N. C.	96.0

4329	do.....do.....	100.0
4617	Slate Seed Co., South Boston, Va.....	96.0
4492	do.....do.....	100.0
4483	do.....do.....	100.0
4482	do.....do.....	98.0
4481	do.....do.....	98.0
4609	T. W. Wood & Sons, Richmond, Va.....	100.0
4608	do.....do.....	99.0
4607	do.....do.....	99.0
4606	do.....do.....	98.0
4605	do.....do.....	96.0
4604	do.....do.....	100.0
4603	do.....do.....	100.0
4602	do.....do.....	98.0
4601	do.....do.....	100.0
4585	do.....do.....	99.0
4584	do.....do.....	99.0
4477	do.....do.....	96.0
4476	do.....do.....	98.0
4475	do.....do.....	98.0
4474	do.....do.....	100.0
4473	do.....do.....	96.0
4448	do.....do.....	100.0
4447	do.....do.....	97.0
4382	do.....do.....	96.5
4326	do.....do.....	97.5

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS  
FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4325	BEANS.....	T. W. Wood & Sons, Richmond, Va.	Isler & Peck, LaGrange, N. C.	96.0
4324	do.....	do.....	J. W. Bryan, Greenville, N. C.	98.0
4323	do.....	do.....	do.....	100.0
4322	do.....	do.....	do.....	99.0
4321	do.....	do.....	Hancock & Co., Beaufort, N. C.	99.0
4244	do.....	do.....	J. W. Carter, Maxton, N. C.	88.0
4243	do.....	do.....	do.....	96.0
4242	do.....	do.....	do.....	93.0
4241	do.....	do.....	P. O. Leggett, Southport, N. C.	92.0
4415	do.....	Wood, Stubbs & Co., Louisville, Ky.	H. E. Kendall, Shelby, N. C.	96.0
4414	do.....	do.....	J. E. Webb, Shelby, N. C.	100.0
4351	do.....	do.....	W. M. Sanders, Smithfield, N. C.	91.0
4342	do.....	do.....	J. F. Clarke, New Bern, N. C.	92.0
4341	do.....	do.....	do.....	97.0
4340	do.....	do.....	do.....	92.0
4443	do.....	do.....	T. W. Kendrick, Charlotte, N. C.	100.0
4444	do.....	do.....	Lathan & Richardson, Monroe, N. C.	88.0
4445	do.....	do.....	do.....	98.0
4478	do.....	do.....	W. J. Nicks, Graham, N. C.	98.0

4479	do.	Jos. A. Iseley & Bro. Co., Burlington, N. C.	99.0
4480	do.	do.	97.0
4610	do.	Farmers Union Agency Co., Winston, N. C.	98.0
4611	do.	do.	100.0
4612	do.	Farmers Cash Feed & Seed Store, Winston, N. C.	100.0
4613	do.	do.	89.0
4614	do.	F. D. Meador Grocery Co., Madison, N. C.	100.0
4615	do.	City Grocery & Hardware Co., Madison, N. C.	100.0
4616	do.	do.	98.0
4250	BEEES.	W. J. Kirkham & Co., Wilmington, N. C.	79.0
4596	do.	Davis Pharmacy, Marion, N. C.	55.5
4543	do.	Warren Drug Co., Greenville, N. C.	70.0
4538	do.	R. E. L. Cook, Tarboro, N. C.	86.5
4367	do.	Blount Pharmacy, Washington, N. C.	60.0
4566	do.	J. F. Clarke, New Bern, N. C.	49.0
4413	do.	Jeffreys & Sons, Goldsboro, N. C.	87.0
4627	do.	S. P. Kirksey, Morganton, N. C.	79.0
4632	do.	R. H. Hyatt & Co., Murphy, N. C.	51.0
4233	do.	B. D. Wilson, Aberdeen, N. C.	72.0 <sup>++4</sup>
4260	do.	W. J. Morgan, Oriental, N. C.	80.5
4265	do.	W. P. Carroll & Son, Snow Hill, N. C.	77.0
4269	do.	J. E. Hood & Co., Kinston, N. C.	73.5
4272	do.	Blount Pharmacy, Washington, N. C.	85.5
4276	do.	J. F. Bishop, Belhaven, N. C.	78.0
4280	do.	J. W. Cowell, Bayboro, N. C.	77.5
4284	do.	Isler & Peele, LaGrange, N. C.	81.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4288	BEETS.....	D. M. Ferry & Co., Detroit, Mich.	J. C. Sprull, Plymouth, N. C.	71.5
4293	do.....	do.....	Cox Drug Co., Richlands, N. C.	79.0
4403	do.....	do.....	W. P. Surles, Dunn, N. C.	78.0
4436	do.....	do.....	Matthews Drug Co., Matthews, N. C.	76.5
4555	do.....	do.....	Ricks, Alford, Batchelor Co., Nashville, N. C.	79.0
4560	do.....	do.....	A. O. Beddard, Winterville, N. C.	86.5
4563	do.....	do.....	P. F. Newton, Morganton, N. C.	94.5
4564	do.....	do.....	do.....	94.0
4635	do.....	do.....	W. B. Fisher, Andrews, N. C.	78.0
4639	do.....	do.....	Barnard & Co., Franklin, N. C.	79.0
4534	do.....	Lake Shore Seed Co., Dunkirk, N. Y.	Cummings Grocery Co., Tarboro, N. C.	90.0
4530	do.....	do.....	W. J. Hodges, Williamston, N. C.	81.0
4308	do.....	do.....	H. E. Daughtery, Dover, N. C.	72.0
4305	do.....	do.....	H. H. Satterthwaite, Washington, N. C.	88.0
4296	do.....	do.....	J. F. Clarke, New Bern, N. C.	66.5
4527	do.....	D. Landreth Seed Co., Bristol, Pa.	Ahoskie Supply Co., Ahoskie, N. C.	61.5
4523	do.....	do.....	T. H. Nicholson, Murfreesboro, N. C.	87.0
4313	do.....	do.....	Beaufort Drug Co., Beaufort, N. C.	19.0
4387	do.....	Leonard Seed Co., Chicago, Ill.	J. W. Johnson, Warsaw, N. C.	54.0

4368	do	J. B. Rice Seed Co., Cambridge, N. Y.	Worthy & Ethredge, Washington, N. C.	23.0
4249	do	do	A. S. Huske, Fayetteville, N. C.	78.5
4511	do	Slate Seed Co., South Boston, Va.	Durham Seed House, Durham, N. C.	87.0
4547	do	T. W. Wood & Sons, Richmond, Va.	M. M. Sauls, Ayden, N. C.	74.0
4419	do	do	Sherrill & Reece, Statesville, N. C.	79.5
4365	do	do	A. J. Cox & Co., Washington, N. C.	71.0
4255	do	do	Watson's Pharmacy, Southport, N. C.	94.0
4229	do	do	A. S. Huske, Fayetteville, N. C.	86.0
4510	do	Wood, Stubbs & Co., Louisville, Ky.	W. J. Nicks, Graham, N. C.	90.5
4552	do	do	H. C. Joyner, Rocky Mount, N. C.	71.5
4576	do	Dealer not given.	Grant's Pharmacy, Asheville, N. C.	71.0
4579	CABBAGE	American Seed Co., Detroit, Mich.	Smith Grocery Co., Lexington, N. C.	60.0
4512	do	Robert Buist Co., Philadelphia, Pa.	Warren Drug Co., Greenville, N. C.	75.5
4379	do	do	J. F. Clarke, New Bern, N. C.	50.0
4630	do	Crosman Bros. Co., Rochester, N. Y.	R. H. Hyatt & Co., Murphy, N. C.	23.5
4263	do	D. M. Ferry & Co., Detroit, Mich.	W. P. Carroll & Son, Snow Hill, N. C.	85.0
4267	do	do	J. E. Hood & Co., Kinston, N. C.	73.5
4291	do	do	Cox Drug Co., Richlands, N. C.	93.5
4402	do	do	W. P. Surles, Dunn, N. C.	82.5
4434	do	do	Matthews Drug Co., Matthews, N. C.	88.0
4554	do	do	Ricks, Alford, Batchelor Co., Nashville, N. C.	88.0
4562	do	do	P. F. Newton & Co., Morganton, N. C.	69.0
4566	do	do	J. T. Thompson, Saluda, N. C.	91.5
4650	do	do	Berry Bros., Drexel, N. C.	71.0
4526	do	D. Landreth Seed Co., Bristol, Pa.	Ahoskie Supply Co., Ahoskie, N. C.	53.0
4522	do	do	T. H. Nicholson, Murfreesboro, N. C.	90.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 45 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4380	CABBAGE	Leonard Seed Co., Chicago, Ill.	J. E. Hood & Co., Kinston, N. C.	88.5
4377	do.	J. B. Rice Seed Co., Cambridge, N. Y.	E. B. Marston Drug Co., Kinston, N. C.	98.0
4546	do.	T. W. Wood & Sons, Richmond, Va.	M. M. Sauls, Ayden, N. C.	92.0
4228	do.	do.	A. S. Husko, Fayetteville, N. C.	63.5
4225	do.	do.	Oscar High, Whiteville, N. C.	83.0
4224	do.	do.	do.	68.0
4223	do.	do.	do.	86.0
4218	do.	do.	P. O. Leggett, Southport, N. C.	76.5
4550	do.	Wood, Stubbs & Co., Louisville, Ky.	H. C. Joyner, Rocky Mount, N. C.	91.0
4574	do.	Dealers not given.	Grant's Pharmacy, Asheville, N. C.	50.5
4565	CARROT	D. M. Ferry & Co., Detroit, Mich.	P. F. Newton & Co., Morganton, N. C.	61.0
4378	COLLARDS	Robert Buist Co., Philadelphia, Pa.	J. F. Clarke, New Bern, N. C.	88.0
4435	do.	D. M. Ferry & Co., Detroit, Mich.	Matthews Drug Co., Matthews, N. C.	84.0
4454	SWEET CORN	American Seed Co., Detroit, Mich.	S. T. Holbrook, Huntersville, N. C.	92.0
4395	do.	W. W. Barnard Co., Chicago, Ill.	T. N. Waters & Bro., Goldsboro, N. C.	100.0
4595	do.	Robert Buist Co., Philadelphia, Pa.	Davis Pharmacy, Marion, N. C.	61.0
4518	do.	do.	R. E. L. Cook, Tarboro, N. C.	100.0
4453	do.	do.	Parsons Drug Co., Wadesboro, N. C.	98.0
4451	do.	do.	do.	86.0



4424	do.....	Boyd Feed Co., Hickory, N. C.....	72.0
4396	do.....	Warsaw Drug Co., Warsaw, N. C.....	88.0
4408	do.....	J. H. Monger, Sanford, N. C.....	99.0
4519	do.....	Carrington-Rogers Drug Co., Durham, N. C.....	94.0
4423	do.....	Freeze Drug Co., Newton, N. C.....	86.0
4422	do.....	J. H. Rudisill & Co., Lincolnton, N. C.....	72.0
4351	do.....	A. S. Huske, Fayetteville, N. C.....	93.0
4252	do.....	do.....	99.0
4375	do.....	Worthy & Ethredge, Washington, N. C.....	100.0
4392	do.....	R. B. Herring & Co., Clinton, N. C.....	94.0
4393	do.....	do.....	97.0
4516	do.....	W. W. Parker, Henderson, N. C.....	98.0
4517	do.....	do.....	98.0
4593	do.....	Leslie's Drug Store, Morganton, N. C.....	92.0
4512	do.....	Jos. A. Isley & Bro. Co., Burlington, N. C.....	97.0
4513	do.....	do.....	77.0
4520	do.....	Carrington-Rogers Drug Co., Durham, N. C.....	94.0
4521	do.....	do.....	99.0
4645	do.....	Coulter & Little, Catawba, N. C.....	98.0
4644	do.....	do.....	67.0
4624	do.....	Farmers Union Agency Co., Winston-Salem, N. C.....	60.0
4623	do.....	City Feed Co., Hickory, N. C.....	80.0
4515	do.....	Mebane Drug Co., Mebane, N. C.....	94.0
4514	do.....	do.....	86.0
4452	do.....	Miller-White Co., Mooresville, N. C.....	96.0
4426	do.....	Gaston Seed & Provision Co., Gastonia, N. C.....	94.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 45 SAMPLES IN ALL, COLLECTED BY INSPECTORS FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4425	SWEET CORN	T. W. Wood & Sons, Richmond, Va.	Gaston Seed & Provision Co., Gastonia, N. C.	95.0
4394	do.	do.	Fuquay Springs Drug Co., Fuquay Springs, N. C.	89.0
4374	do.	do.	J. E. Hood & Co., Kinston, N. C.	92.0
4373	do.	do.	do.	96.0
4372	do.	do.	do.	94.0
4421	do.	Wood, Stubbs & Co., Louisville, Ky.	J. E. Webb, Shelby, N. C.	100.0
4391	do.	do.	Creech Drug Co., Smithfield, N. C.	87.0
4256	CUCUMBER	Robert Buist Co., Philadelphia, Pa.	R. R. Bellamy, Wilmington, N. C.	86.0
4235	do.	D. M. Ferry & Co., Detroit, Mich.	B. D. Wilson, Aberdeen, N. C.	78.0
4237	do.	do.	Matthews Drug Co., Matthews, N. C.	79.5
4568	do.	do.	J. T. Thompson, Saluda, N. C.	58.0
4652	do.	do.	Berry Bros., Drexel, N. C.	79.0
4376	do.	J. B. Rice Seed Co., Cambridge, N. Y.	Worthy & Ethredge, Washington, N. C.	75.0
4549	do.	T. W. Wood & Sons, Richmond, Va.	M. M. Sauls, Ayden, N. C.	91.0
4230	do.	do.	A. S. Huske, Fayetteville, N. C.	99.0
4553	do.	Wood, Stubbs & Co., Louisville, Ky.	H. C. Joyner, Rocky Mount, N. C.	96.0
4578	do.	Dealer not given.	Grant's Pharmacy, Asheville, N. C.	98.5
4544	LETTUCE	Robert Buist Co., Philadelphia, Pa.	Warren Drug Co., Greenville, N. C.	96.0
4539	do.	do.	R. E. L. Cook, Tarboro, N. C.	96.5

4628	do	Crosman Bros. Co., Rochester, N. Y.	S. P. Kirksey, Morganton, N. C.	39.5
4261	do	D. M. Ferry & Co., Detroit, Mich.	W. J. Morgan, Oriental, N. C.	70.0
4277	do	do	J. F. Bishop, Belhaven, N. C.	95.0
4281	do	do	J. W. Cowell, Bayboro, N. C.	85.5
4285	do	do	Isler & Peele, LaGrange, N. C.	75.0
4289	do	do	J. C. Spruill, Plymouth, N. C.	99.0
4294	do	do	Cox Drug Co., Richlands, N. C.	79.0
4556	do	do	Ricks, Alford, Batchelor Co., Nashville, N. C.	98.0
4561	do	do	A. O. Beddard, Winterville, N. C.	99.0
4636	do	do	W. B. Fisher, Andrews, N. C.	99.0
4640	do	do	Barnard & Co., Franklin, N. C.	88.0
4535	do	Lake Shore Seed Co., Dunkirk, N. Y.	Cummings Grocery Co., Tarboro, N. C.	87.5
4309	do	do	H. E. Daugherty, Dover, N. C.	49.5
4301	do	do	Floyd Barwick, LaGrange, N. C.	96.5
4524	do	D. Landreth Seed Co., Bristol, Pa.	T. H. Nicholson, Mufreesboro, N. C.	93.5
4314	do	do	Beaufort Drug Co., Beaufort, N. C.	74.0
4571	do	T. W. Wood & Sons, Richmond, Va.	J. T. Turner, Asheboro, N. C.	34.5
4577	do	Dealer not given	Grant's Pharmacy, Asheville, N. C.	71.5
4455	MUSKMELON	American Seed Co., Detroit, Mich.	S. T. Holbrook, Huntersville, N. C.	91.0
4236	do	D. M. Ferry & Co., Detroit, Mich.	B. D. Wilson, Aberdeen, N. C.	87.0
4653	do	do	Berry Bros., Drexel, N. C.	89.5
4428	do	D. Landreth Seed Co., Bristol, Pa.	J. H. Rudisill & Co., Lincolnton	74.5
4257	do	Leonard Seed Co., Chicago, Ill.	W. J. Kirkham & Co., Wilmington, N. C.	84.0
4648	do	J. B. Rice Seed Co., Cambridge, N. Y.	Hunter's Pharmacy, Hendersonville, N. C.	83.0
4647	do	T. W. Wood & Sons, Richmond, Va.	Coulter & Little, Catawba, N. C.	95.5
4646	do	do	do	88.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS  
FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4427	MUSKMELON.....	T. W. Wood & Sons, Richmond, Va.	Gaston Seed & Provision Co., Gastonia, N. C.	92.5
4274	MUSTARD.....	D. M. Ferry & Co., Detroit, Mich.	Blount Pharmacy, Washington, N. C.	28.5
4559	do.....	do.....	A. O. Beddard, Winterville, N. C.	14.5
4525	do.....	D. Landreth Seed Co., Bristol, Pa.	T. H. Nicholson, Murfreesboro, N. C.	90.5
4575	do.....	Dealer not given.	Grant's Pharmacy, Asheville, N. C.	64.0
4222	OKRA.....	T. W. Wood & Sons, Richmond, Va.	P. O. Leggett, Southport, N. C.	63.0
4237	ONION.....	D. M. Ferry & Co., Detroit, Mich.	B. D. Wilson, Aberdeen, N. C.	65.5
4405	do.....	do.....	W. P. Surles, Dunn, N. C.	82.5
4573	do.....	T. W. Wood & Sons, Richmond, Va.	J. T. Turner, Asheboro, N. C.	12.0
4657	do.....	do.....	Kelly & Sons, Black Mountain, N. C.	0.0
4361	PEAS.....	W. W. Barnard Co., Chicago, Ill.	Chas. B. Hill, New Bern, N. C.	83.0
4625	do.....	Robert Buist Co., Philadelphia, Pa.	Tucker's Drug Store, Reidsville, N. C.	31.0
4498	do.....	do.....	J. G. Hall, Oxford, N. C.	98.0
4497	do.....	do.....	R. E. L. Cook, Tarboro, N. C.	97.0
4389	do.....	do.....	J. C. Peterson, Clinton, N. C.	98.0
4363	do.....	do.....	Blount Pharmacy, Washington, N. C.	94.0
4508	do.....	D. M. Ferry & Co., Detroit, Mich.	M. S. Schultz, Greenville, N. C.	98.0
4537	do.....	Lake Shore Seed Co., Dunkirk, N. Y.	Cummings Grocery Co., Tarboro, N. C.	90.0
4533	do.....	do.....	W. J. Hodges, Williamston, N. C.	74.0

4310	do.....	H. E. Daugherty, Dover, N. C.....	66.0
4302	do.....	Floyd Barwick, LaGrange, N. C.....	81.0
4298	do.....	J. F. Clarke, New Bern, N. C.....	44.0
4503	do.....	D. Landreth Seed Co., Bristol, Pa.....	83.0
4502	do.....	do.....	46.5
4501	do.....	Thomas Bros., Henderson, N. C.....	92.0
4500	do.....	E. A. Rosemond, Hillsboro, N. C.....	93.0
4499	do.....	Hamilton Drug Co., Oxford, N. C.....	94.5
4364	do.....	Henry Dunn, Kinston, N. C.....	97.0
4504	do.....	W. A. Mabry, Durham, N. C.....	99.0
4349	do.....	J. E. Hood & Co., Kinston, N. C.....	96.0
4348	do.....	do.....	93.0
4347	do.....	do.....	86.0
4346	do.....	do.....	98.0
4345	do.....	Temple Drug Co., Kinston, N. C.....	94.0
4344	do.....	W. H. Hampton & Son, Plymouth, N. C.....	96.0
4247	do.....	R. R. Bellamy, Wilmington, N. C.....	90.0
4592	do.....	J. B. Rice Seed Co., Cambridge, N. Y.....	98.0
4507	do.....	do.....	98.0
4411	do.....	S. J. Adams, Raleigh, N. C.....	99.0
4390	do.....	T. N. Walters & Bro., Goldsboro, N. C.....	99.0
4354	do.....	Duffy's Pharmacy, New Bern, N. C.....	97.5
4353	do.....	C. L. Spencer, New Bern, N. C.....	98.0
4352	do.....	Burris & Parker, New Bern, N. C.....	96.0
4351	do.....	do.....	83.0
4350	do.....	E. B. Marston Drug Co., Kinston, N. C.....	99.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS  
FROM JULY 15, 1914, TO JULY 15, 1915.—(CONTINUED.)

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4248	Peas.....	J. B. Rice Seed Co., Cambridge, N. Y.....	A. S. Huske, Fayetteville, N. C.....	86.0
4362	.....do.....	Rockford Seed Co., Rockford, Ill.....	S. W. Willis, New Bern, N. C.....	82.0
4056	.....do.....	T. W. Wood & Sons, Richmond, Va.....	Carrington-Rogers Drug Co., Durham, N. C.....	91.0
4505	.....do.....	.....do.....	Piye Points Drug Co., Durham, N. C.....	81.0
4449	.....do.....	.....do.....	Miller-White Co., Mooresville, N. C.....	100.0
4450	.....do.....	.....do.....	English Drug Co., Monroe, N. C.....	99.0
4388	.....do.....	.....do.....	Fuquay Springs Drug Co., Fuquay Springs, N. C.....	97.5
4359	.....do.....	.....do.....	Isler & Peole, LaGrange, N. C.....	88.0
4355	.....do.....	.....do.....	J. W. Bryan, Greenville, N. C.....	94.0
4356	.....do.....	.....do.....	J. E. Hood & Co., Kinston, N. C.....	95.0
4357	.....do.....	.....do.....	E. B. Marston Drug Co., Kinston, N. C.....	97.0
4358	.....do.....	.....do.....	Hancock & Co., Beaufort, N. C.....	85.0
4246	.....do.....	.....do.....	Watson's Pharmacy, Southport, N. C.....	92.0
4245	.....do.....	.....do.....	P. O. Leggett, Southport, N. C.....	98.5
4360	.....do.....	Wood, Stubbs & Co., Louisville, Ky.....	J. F. Clarke, New Bern, N. C.....	97.0
4583	Pepper.....	American Seed Co., Detroit, Mich.....	Smith Grocery Co., Lexington, N. C.....	62.0
4582	.....do.....	.....do.....	.....do.....	26.0
4397	.....do.....	Robert Buist Co., Philadelphia, Pa.....	Warsaw Drug Co., Warsaw, N. C.....	62.5
4570	.....do.....	D. M. Ferry & Co., Detroit, Mich.....	J. T. Thompson, Saluda, N. C.....	53.0

4221	do.....	T. W. Wood & Sons, Richmond, Va.....	P. O. Leggett, Southport, N. C.....	51.0
4545	Radish.....	Robert Buist Co., Philadelphia, Pa.....	Warren Drug Co., Greenville, N. C.....	98.5
4541	do.....	do.....	R. E. L. Cook, Tarboro, N. C.....	65.0
4629	do.....	Crosman Bros. Co., Rochester, N. Y.....	S. P. Kirksey, Morganton, N. C.....	87.5
4633	do.....	do.....	R. H. Hyatt & Co., Murphy, N. C.....	92.0
4262	do.....	D. M. Ferry & Co., Detroit, Mich.....	W. J. Morgan, Oriental, N. C.....	97.5
4266	do.....	do.....	W. P. Carroll & Son, Snow Hill, N. C.....	98.5
4270	do.....	do.....	J. E. Hood & Co., Kinston, N. C.....	97.0
4273	do.....	do.....	Blount Pharmacy, Washington, N. C.....	95.0
4278	do.....	do.....	J. B. Bishop, Belhaven, N. C.....	95.5
4282	do.....	do.....	J. W. Corvell, Bayboro, N. C.....	87.0
4286	do.....	do.....	Isler & Peele, LaGrange, N. C.....	95.0
4290	do.....	do.....	J. C. Spruill, Plymouth, N. C.....	95.0
4557	do.....	do.....	Ricks, Alford, Batchelor Co., Nashville, N. C.....	99.0
4637	do.....	do.....	W. B. Fisher, Andrews, N. C.....	94.0
4641	do.....	do.....	Barnard & Co., Franklin, N. C.....	99.5
4651	do.....	do.....	Berry Bros., Drexel, N. C.....	95.0
4531	do.....	Lake Shore Seed Co., Dunkirk, N. Y.....	W. J. Hodges, Williamston, N. C.....	98.5
4297	do.....	do.....	J. F. Clarke, New Bern, N. C.....	98.0
4306	do.....	do.....	H. H. Satterthwait, Washington, N. C.....	85.5
4315	do.....	D. Landreth Seed Co., Bristol, Pa.....	Beaufort Drug Co., Beaufort, N. C.....	100.0
4655	do.....	T. W. Wood & Sons, Richmond, Va.....	Kelly & Sons, Black Mountain, N. C.....	82.0
4548	do.....	do.....	M. M. Sauls, Ayden, N. C.....	88.5
4420	do.....	do.....	Jennings & Co., Greensboro, N. C.....	85.0
4227	do.....	do.....	Oscar High, Whiteville, N. C.....	72.0
4220	do.....	do.....	P. O. Leggett, Southport, N. C.....	67.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 445 SAMPLES IN ALL, COLLECTED BY INSPECTORS  
FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4580	ROUTABAGA.....	American Seed Co., Detroit, Mich.	Smith Grocery Co., Lexington, N. C.	63.0
4279	.....do.....	D. M. Ferry & Co., Detroit, Mich.	J. W. Cowell, Bayboro, N. C.	81.0
4654	RHUBARB.....	.....do.....	Berry Bros., Drexel, N. C.	66.5
4656	SALSIFY.....	T. W. Wood & Sons, Richmond, Va.	Kelly & Sons, Black Mountain, N. C.	77.0
4217	SPINACH.....	.....do.....	Grant's Pharmacy, Asheville, N. C.	56.0
4569	SQUASH.....	D. M. Ferry & Co., Detroit, Mich.	J. T. Thompson, Saluda, N. C.	79.0
4572	.....do.....	T. W. Wood & Sons, Richmond, Va.	J. T. Turner, Asheboro, N. C.	84.0
4658	.....do.....	.....do.....	Kelly & Sons, Black Mountain, N. C.	80.0
4232	.....do.....	.....do.....	A. S. Huske, Fayetteville, N. C.	74.0
4581	TOMATO.....	American Seed Co., Detroit, Mich.	Smith Grocery Co., Lexington, N. C.	89.0
4540	.....do.....	Robert Buist Co., Philadelphia, Pa.	R. E. L. Cook, Tarboro, N. C.	90.0
4258	.....do.....	.....do.....	R. R. Bellamy, Wilmington, N. C.	92.5
4294	.....do.....	D. M. Ferry & Co., Detroit, Mich.	B. D. Wilson, Aberdeen, N. C.	74.5
4404	.....do.....	.....do.....	W. P. Surles, Dunn, N. C.	78.0
4438	.....do.....	.....do.....	Matthews Drug Co., Matthews, N. C.	81.0
4567	.....do.....	.....do.....	J. T. Thompson, Saluda, N. C.	86.0
4528	.....do.....	D. Landreth Seed Co., Bristol, Pa.	Ahoskie Supply Co., Ahoskie, N. C.	73.0
4649	.....do.....	J. B. Rice Seed Co., Cambridge, N. Y.	Hunter's Pharmacy, Hendersonville, N. C.	83.5
4231	.....do.....	T. W. Wood & Sons, Richmond, Va.	A. S. Huske, Fayetteville, N. C.	96.0



4219	do.....	P. O. Leggett, Southport, N. C.....	70.0
4215	TURNIPS.....	W. A. Leggett, Edenton, N. C.....	63.5
4631	do.....	R. H. Hyatt & Co., Murphy, N. C.....	92.5
4626	do.....	S. P. Kirksey, Morganton, N. C.....	57.0
4259	do.....	W. J. Morgan, Oriental, N. C.....	90.0
4264	do.....	W. P. Carroll & Son, Snow Hill, N. C.....	95.5
4268	do.....	J. E. Hood & Co., Kinston, N. C.....	95.5
4271	do.....	Blount Pharmacy, Washington, N. C.....	90.5
4275	do.....	J. F. Bishop, Belhaven, N. C.....	82.5
4283	do.....	Isler & Peele, LaGrange, N. C.....	91.0
4287	do.....	J. C. Spruill, Plymouth, N. C.....	84.5
4292	do.....	Cox Drug Co., Richlands, N. C.....	83.0
4401	do.....	W. P. Surles, Dunn, N. C.....	93.5
4509	do.....	M. S. Schultz, Greenville, N. C.....	82.0
4558	do.....	A. O. Beddard, Winterville, N. C.....	92.0
4634	do.....	W. B. Fisher, Andrews, N. C.....	99.0
4638	do.....	Barnard & Co., Franklin, N. C.....	91.0
4295	do.....	J. F. Clarke, New Bern, N. C.....	85.0
4300	do.....	Floyd Barwick LaGrange, N. C.....	99.5
4304	do.....	H. H. Satterthwaite, Washington, N. C.....	99.0
4312	do.....	Beaufort Drug Co., Beaufort, N. C.....	86.5
4226	do.....	Oscar High, Whiteville, N. C.....	82.0
4216	do.....	Gaston Seed & Provision Co., Gastonia, N. C.....	75.5
4214	do.....	W. J. Kirkham & Co., Wilmington, N. C.....	89.0
4551	do.....	H. C. Joyner, Rocky Mount, N. C.....	89.5
4456	WATERMELON.....	S. T. Holbrook, Huntersville, N. C.....	88.0
4457	do.....	Fox & Lyon, Wadesboro, N. C.....	88.0

TABLE XV.—RESULTS OF GERMINATION TESTS OF 22 KINDS OF VEGETABLE SEEDS, 45 SAMPLES IN ALL, COLLECTED BY INSPECTORS  
FROM JULY 15, 1914, TO JULY 15, 1915.—CONTINUED.

Laboratory Number	Kind of Seed	Wholesale Dealer	Retail Dealer	Per Cent of Germination
4432	WATERMELON.....	Robert Buist Co., Philadelphia, Pa.....	Clapp's Drug Store, Newton, N. C.....	88.0
4253	do.....	do.....	R. R. Bellamy, Wilmington, N. C.....	77.0
4400	do.....	D. M. Ferry & Co., Detroit, Mich.....	J. H. Pate, Goldsboro, N. C.....	78.0
4594	do.....	do.....	Cabarrus Drug Co., Concord, N. C.....	92.0
4458	do.....	Girardeau Seed Co., Monticello, Fla.....	Parsons Drug Co., Wadesboro, N. C.....	82.0
4529	do.....	D. Landreth Seed Co., Bristol, Pa.....	Ahoskie Supply Co., Ahoskie, N. C.....	32.0
4429	do.....	do.....	J. H. Rudisill & Co., Lincolnnton, N. C.....	59.0
4406	do.....	do.....	J. H. Monger, Sanford, N. C.....	75.0
4370	do.....	Leonard Seed Co., Chicago, Ill.....	Temple Drug Co., Kinston, N. C.....	77.0
4399	do.....	Geo. R. Pedrick & Son, Pedricktown, N. J.....	Jeffreys & Sons, Goldsboro, N. C.....	78.5
4369	do.....	J. B. Rice Seed Co., Cambridge, N. Y.....	Worthy & Ethredge, Washington, N. C.....	78.0
4410	do.....	do.....	S. J. Adams, Raleigh, N. C.....	88.0
4431	do.....	do.....	Scott Seed Co., Greensboro, N. C.....	94.0
4643	do.....	T. W. Wood & Sons, Richmond, Va.....	Coulter & Little, Catawba, N. C.....	85.0
4642	do.....	do.....	do.....	100.0
4433	do.....	do.....	Gaston Seed & Provision Co., Gastonia, N. C.....	80.0
4371	do.....	do.....	Isler & Peele, LaGrange, N. C.....	93.0
4430	do.....	Wood, Stubbs & Co., Louisville, Ky.....	H. E. Kendall, Shelby, N. C.....	80.0
4398	do.....	do.....	Greesh Drug Co., Smithfield, N. C.....	83.0
4254	do.....	do.....	W. J. Kirkham & Co., Wilmington, N. C.....	95.0

TABLE NO. 16.

SHOWING NUMBER AND AVERAGE PER CENT OF GERMINATION OF VEGETABLE SEED SAMPLES  
TESTED, ACCORDING TO WHOLESALE DEALERS.

Wholesale Dealer	Number of Samples Tested	Average Per Cent of Germination
American Seed Co., Detroit, Mich.....	8	71.37
W. W. Barnard Co., Chicago, Ill.....	3	93.00
J. Bolgiano & Sons, Baltimore, Md.....	2	89.50
Robert Buist Co., Philadelphia, Pa.....	47	82.34
Eve ett B. Clarke Seed Co., Milford, Conn.....	2	93.50
Crosman Bros., Co., Rochester, N. Y.....	10	70.90
Diggs & Beadles, Richmond, Va.....	2	96.50
D. M. Ferry & Co., Detroit, Mich.....	92	84.29
Girardeau Seed Co., Monticello, Fla.....	1	82.00
Lake Shore Seed Co., Dunkirk, N. Y.....	25	81.50
D. Landreth Seed Co., Bristol, Pa.....	47	85.10
Leonard Seed Co., Chicago, Ill.....	27	86.30
George R. Pedrick & Son, Pedriktown, N. J.....	1	78.50
J. B. Rice Seed Co., Cambridge, N. Y.....	38	85.40
Rockford Seed Co., Rockford, Ill.....	1	82.00
Slate Seed Co., South Boston, Va.....	10	94.60
Wood, Stubbs & Co., Louisville, Ky.....	30	93.78
T. W. Wood & Sons, Richmond, Va.....	94	86.41
Dealer not given.....	5	70.10

## LEAF TOBACCO REPORT FOR JULY, 1915.

<i>Towns.</i>	<i>First-hand.</i>	<i>Dealers.</i>	<i>Resold.</i>	<i>Total.</i>
Fairmont .....	344,864	756	12,963	358,583
Fair Bluff .....	183,512	3,522	23,474	210,508
Whiteville .....	90,231		3,200	93,431
Reidsville.....	1,588			1,588
	<hr/>	<hr/>	<hr/>	<hr/>
	620,195	4,278	39,637	664,110

The above statistics gathered from the leaf tobacco warehouses of the State by the North Carolina Department of Agriculture, for the month of July, 1915.

W. A. GRAHAM, *Commissioner.*

Total pounds for July, 1914..... 134,663



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10/10/10

**THE BULLETIN**  
**OF THE**  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE**  
**RALEIGH**

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Vol. 36, No. 10

OCTOBER, 1915

Whole No. 213

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**COMMERCIAL FEEDS**

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of June 6, 1900.

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EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS

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\*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In coöperation with Bureau of Plant Industry, United States Department of Agriculture.



## LETTER OF TRANSMITTAL

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HON. W. A. GRAHAM,  
*Commissioner of Agriculture.*

SIR:—I submit herewith manuscript covering the inspection and analysis of concentrated stock feeds during the past year. I recommend its publication as the October BULLETIN.

Very respectfully,

B. W. KILGORE,  
*State Chemist.*

Approved for printing:

W. A. GRAHAM, *Commissioner.*



# COMMERCIAL FEEDS

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J. M. PICKEL, FEED CHEMIST.\*

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Five hundred and thirty-six (536) samples were analyzed during the year ending midsummer 1915; 375 and 363 during the years 1914 and 1913, respectively. One hundred and fifty-five (155) samples analyzed this year (1915) were unofficial, that is, sent in by farmers, dairymen, millers, dealers, and are not published or treated of in this report. The remaining 381 samples were collected throughout the State by the official inspector. This report deals with these latter, or official, samples. They carried 1,098 guarantees, counting only those on protein, fat and fiber; in 270 instances (28.5 per cent), the feeds were below guaranty,† a slight increase (.5 per cent) over last year. If we include in the estimate only those cases in which the protein was found to be one or more per cent below guaranty, and fat one-half or more per cent below guaranty, and crude fiber one or more per cent above guaranty, then out of the total of 1,098 guaranties only 137 or 12.5 per cent were not as good, or substantially as good, as claimed.

The following table gives a general summary of the kinds of feeds analyzed, the number of each, the number of guaranties of protein, fat and fiber; the number deficient and the percentage of deficiencies in each case.

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\*Assisted by Messrs. E. S. Dewar and J. Q. Jackson. Only a small fraction of the time of these gentlemen—as much as is indicated by the making of the protein determinations—was given to the work of this bulletin. In addition to the duties of Feed Chemist, Dr. Pickel has charge of the toxicological and water work of the Department.

†In this estimate, all crude fibers which were found to be *above* guarantee are reckoned as *below*, that is, not as good as guaranty; this is because it is the maximum crude fiber, and not the minimum, as in the case of protein and fat, that is guaranteed. Crude fiber is regarded as a dilutant of a feed—the more of it in a feed the less valuable the feed; the opposite of this is true in the case of protein and fat.




For the details of the analyses, guaranties, prices, manufacturer's address, of the various kinds of feeds, the reader is referred to the tables on pages 12 to 53 inclusive.

## ABSTRACTS OF THE LAWS AND REGULATIONS

### (1) THE FEEDING STUFFS LAW.

The substances subject to this law are designated by the law as "*Concentrated Commercial Feeding Stuffs*," and "*include all feeds used for livestock and poultry, except hays, straws and corn stover, when the same are not mixed with other materials.*" and, except "*the whole seeds or grains of cereals when not mixed with other materials.*"

Every lot or parcel of concentrated commercial feeding stuff offered for sale in this State must bear a tag (printed with printers' ink, not a rubber stamp) of which the following is a specimen as to form and contents:

 (STAMP TO GO HERE)	<b>100 POUNDS</b> <b>WHEAT BRAN</b> <small>MANUFACTURED BY</small> <b>JOHN JONES &amp; CO.</b> <small>RALEIGH, N. C.</small>	
	<b>GUARANTEED ANALYSIS</b>	
	PROTEIN. . . . .	<i>minimum</i> Per Cent.
	FAT. . . . .	<i>minimum</i> Per Cent.
	FIBER. . . . .	<i>maximum</i> Per Cent.
	CARBOHYDRATES. . . . .	Per Cent.
INGREDIENTS: ..... ..... .....		

Instead of a tag, the same information and guaranty printed on the bag or package will answer.

Each ingredient must be stated specifically by name, and this statement constitutes part of the guaranty.

Each brand of feeding stuff must be registered with the Commissioner of Agriculture. Registration blanks are to be had by applying to the Feed Chemist.

No mixed feeds that contain less than 9 per cent of protein, except mixtures of whole or partially ground grains, will be accepted for registration.

Feeding stuffs must be put up in standard weight bags or packages of 25, 50, 75, 100, 125, 150, 175, or 200 pounds each.

But poultry feeds may be put up in smaller bags, boxes or other containers of less than 25 pounds net weight: *Provided, first*, that these

containers be labeled with their net weight and the other usual guaranties; and, *Provided, further*, that these smaller packages be enclosed in a larger bag or container of standard net weight of 25, 50, 75, etc., pounds; the said larger container to bear the requisite tax stamp and guaranties.

The law makes provision for selling in bulk also.

Each bag or package of concentrated commercial feeding stuff must bear a tax stamp at the rate of twenty cents per ton. These stamps are issued in denominations of  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1 cent, etc., to correspond to the weight of the bag or package, and are to be had by applying to the Commissioner of Agriculture.

Any manufacturer, importer, jobber, agent or dealer who shall violate any of the provisions of the Feeding Stuffs Act, upon conviction thereof, shall be fined not exceeding fifty dollars for the first offense nor more than two hundred dollars for each subsequent offense.

Copies of the law and of the rulings, regulations, definitions and standards which have been adopted by the Board of Agriculture are to be had upon application.

## (2) THE COTTON SEED MEAL LAW.

All cotton seed meal sold for use as a fertilizer or feed is subject to an inspection tax of twenty cents per ton.

All cotton seed meal offered for sale, unless sold to manufacturers for use in the manufacture of fertilizers, must have the following information branded on the bag containing it or on a tag attached thereto: (1) cotton seed meal with brand; (2) weight of package; (3) ammonia or nitrogen; (4) name and address of manufacturer.

Cotton seed meal containing a minimum of seven and one-half per cent of ammonia (equivalent to 38.6 per cent protein) is standard meal and may be so branded. Meal containing eight (8) per cent of ammonia is high-grade meal and may be so branded.

Tax tags are to be had on application to the Commissioner of Agriculture.

Penalties for selling meal without tags, reusing tags, removing meal and for other violations of the law are provided.

Copies of the law are to be had by applying to the Commissioner of Agriculture.

### *Cotton Seed Feed.*

All mixtures of cotton seed meal and hulls containing less than 38.6 per cent of protein shall be branded Cotton Seed Feed, or a name may be given which does not contain the word "meal" or any other word that might be misleading. Cotton seed feed—also cotton seed meal when sold as feed—is subject to all the provisions of the concentrated commercial feeding stuff law.

### (3) STOCK OR POULTRY TONICS, REGULATORS OR CONDITIONERS.

These substances must be registered and guaranteed.

A registration fee of twenty dollars (\$20) for each separate brand shall be paid by the manufacturers or sellers of the same to the Commissioner of Agriculture during the month of January of each year.

There are penalties of fifty to one hundred dollars for violations of the law.

Copies of the law are to be had by applying to the Commissioner of Agriculture.

### TERMS USED IN ANALYSIS

*Ash.* This is the incombustible part of the plant, earthly matter drawn from the soil by the plant, and taken over into the animal organism from plants.

*Protein.* This is the nitrogenous portion of the plant. Lean meat, white of eggs, curd of milk, gluten of grain are examples.

*Fiber.* The frame-work of the plant; trunk and stem are hardened fiber mixed with mineral and other matter; cotton is almost pure fiber.

*Fat.* The portion of plant soluble in ether is classed as fat, but includes small quantity of substances other than fats. Cotton-seed oil, olive oil, peanut oil, the oils of cereals are examples. Tallow, lard, butter and the various animal oils and fats fall into this class.

*Nitrogen-free Extract.* Starch, the various sugars, gums are examples.

*Carbohydrates.* This is a general term, including fiber and nitrogen-free extract.

### ANIMAL FEEDING AND NUTRITION

A fundamental distinction between plants and animals is this: Plants manufacture, so to speak, foods; animals consume, but cannot manufacture food. They merely transform—more or less modify—the food they get from plants, utilize it for their own growth and maintenance and for doing work, or else store it up in their bodies or, as in the case of milk, excrete it.

Animals get the mineral matter for forming bone from plants, a small portion also from water. The function of the carbohydrates and fats in animal nutrition is the production of warmth and energy; for this purpose fat has two and four-tenths the value of carbohydrate pound for pound. The function of protein is to build up, repair and sustain the vital portions of the animal organism,—blood, muscle, nerve, brain; the fats and carbohydrates cannot do this. Protein is capable also of being oxidized, or burned, in the body and producing warmth and energy; and in the absence of adequate fats and carbohydrates is thus utilized; but this is, beside being extravagant, unwholesome. A well balanced ration is one that contains protein, fat, carbohydrate in proper proportion to meet the needs of the animal. These needs vary with the kind of animal, its age and uses.

The following are excellent hand-books on animal feeding and nutrition:—

“Feeds and Feeding” by Prof. W. A. Henry; “Profitable Stock Feeding” by Prof. H. W. Smith; “Manual of Cattle Feeding” by Prof. H. P. Annsby; “The Feeding of Animals” by W. H. Jordan.

#### COMPOSITION OF SOME PURE UNADULTERATED FEEDING STUFFS

Compiled from “*Henry's Feeds and Feeding*,” whose tables are taken mainly from Farmers' Bulletin 22, U. S. Dept. of Agriculture.

By comparing the analyses in the table on the following page with the analyses of feeding stuffs, collected in this State, whose analyses are published in this BULLETIN, one may gain an idea of the purity and worth of these feeding stuffs.



## UNADULTERATED FEEDING STUFFS.

Percentage Composition			
	Protein	Fat	Fiber
Corn, dent.....	10.3	5.0	2.2
Flint.....	10.5	5.0	1.7
Meal.....	9.2	3.8	1.9
Cob.....	2.4	0.5	30.1
Bran.....	9.0	5.8	12.7
Wheat.....	11.9	2.1	1.8
Bran.....	15.4	4.0	9.0
Middlings.....	15.6	4.0	4.6
Shorts.....	14.9	1.5	7.4
Screenings.....	12.5	3.0	4.9
Oats.....	11.8	5.0	9.5
Hulls.....	3.3	1.0	29.7
Rice.....	7.4	0.4	0.2
Hulls.....	3.0	0.7	35.7
Bran.....	12.1	8.8	9.5
Polish.....	11.7	7.3	6.3
Cotton-seed Meal.....	42.3	13.1	5.6
Hulls.....	1.2	2.2	46.3
Cowpea.....	20.8	1.4	4.1
Fodder corn, field cured.....	4.5	1.6	14.3
Green.....	1.8	0.5	5.0
Corn stover, field cured.....	3.8	1.1	19.7
Husks, field cured.....	2.5	0.7	15.8
Leaves, field cured.....	6.0	1.4	21.4
Hay from mixed grasses.....	7.4	2.5	27.2
Kentucky blue grass.....	7.8	3.9	23.0
Red clover.....	12.0	3.3	24.0
In bloom.....	12.4	4.5	33.8
Alfalfa.....	14.3	2.2	25.0
Pea vine.....	13.7	2.3	24.7
Peanut vines (without nuts).....	10.7	4.6	23.6
Wheat straw.....	3.4	1.3	38.1
Oat straw.....	4.0	2.3	37.0
Chaff.....	4.0	1.5	34.0
Wheat chaff.....	4.5	1.4	36.0
Corn silage.....	1.7	0.8	6.0

Percentage Composition				
	Water	Protein	Fat	Fiber
Potato.....	78.9	2.1	0.1	0.6
Sweet potato.....	71.0	1.5	1.3	0.4
Beets.....	88.5	1.5	0.1	0.9
Turnip.....	90.5	1.1	0.2	1.2
Carrots.....	88.6	1.1	0.4	1.3
Cabbage.....	90.5	2.4	0.4	1.5
Beet pulps.....	89.8	0.9		2.4

## ANALYSES OF SAMPLES

## WHEAT BRAN, WHEAT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
633	Pure Wheat Bran.....	Austin-Heaton Co., Dur- ham, N. C.	W. A. Myatt, Raleigh.....	Mar. 2, '15	100	\$1.60
444	Ballard Wheat Bran.....	Ballard & Ballard Co., Louisville, Ky.	T. P. Nash, Elizabeth City	Nov. 10, '14	100	1.60
445	do.....	do.....	W. S. White & Co., Eliza- beth City	Nov. 10, '14	100	1.60
507	Bran.....	do.....	T. P. Nash, Elizabeth City	Jan. 1, '15	100	1.65
404	Wheat Bran.....	Custom Roller Mill, Bry- son, N. C.	Slayden, Fakes & Co., Bryson.	Sept. 18, '14	-----	-----
523	Wheat Bran and Screen- ings.	Dunlop Milling Co., Clarksville, Tenn.	Elmore & Maxwell Co., Greensboro.	Feb. 8, '15	100	1.50
391	do.....	do.....	Adams Grain & Produce Co., Asheville.	July 23, '14	75	1.12
407	Pure Wheat Bran.....	do.....	Beach Bros., Morganton...	Sept. 23, '14	75	1.50
356	Wheat Bran.....	Harrisonburg Milling Co., Harrisonburg, Va.	Job P. Wyatt & Son Co., Raleigh.	June 25, '14	100	1.70
348	do.....	do.....	S. J. Adams, Raleigh.....	June 25, '14	100	1.75
477	Standard Spring Wheat Bran.	Indiana Milling Co., Terre Haute, Ind.	Ray Dawson, Kinston.....	Jan. 1, '15	100	1.75
382	Pallace Bran.....	Kehler Flour Mill, St. Louis, Mo.	Asheville Grocery Co., Asheville.	July 23, '14	75	1.35
561	Pure Wheat Bran and Screenings.	Liberty Mills, Nashville, Tenn.	The Stone Co., Wilming-	Feb. 12, '14	100	1.60
560	do.....	do.....	J. W. Brooks, Wilmington.	Feb. 12, '14	100	1.60
352	do.....	do.....	S. J. Adams, Raleigh.....	June 25, '14	100	1.75
522	do.....	do.....	Elmore Maxwell Co., Greensboro.	Feb. 8, '15	100	1.55
323	do.....	do.....	Parker & Clark, High Point.	June 25, '14	100	1.80
697	do.....	do.....	J. H. Pool, Raleigh.....	July 12, '15	100	1.50
588	Pure Wheat Bran.....	do.....	Merchants Supply Co., Burlington.	Feb. 18, '14	100	1.50
622	do.....	do.....	Carolina Warehouse, Greensboro.	Mar. 1, '15	100	1.60
627	do.....	do.....	Hiatt & Co., Greensboro...	Mar. 1, '15	100	1.60
690	Pure Wheat Bran.....	Liberty Mills, Nashville, Tenn.	Madison Grocery Co., Madison.	July 6, '15	100	1.65
686	do.....	do.....	City Grocery, Madison....	July 6, '15	100	1.50
366	do.....	do.....	W. A. Myatt, Raleigh.....	June 25, '14	100	1.70
628	do.....	do.....	C. B. Gill & Co., Raleigh..	Mar. 3, '15	100	1.60
552	do.....	do.....	Jas. H. Waters, Wilming- ton.	Feb. 11, '15	100	1.60

## OF FEEDS, SEASON 1914-1915

## BRAN WITH SCREENINGS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
633	Guaranteed..	17.0		4.0		8.3		Wheat bran.
	Found.....	13.6	-3.4	4.2	0.2	8.8	0.5	
444	Guaranteed..	15.8		4.4		8.0		do.
	Found.....	15.8	0.0	4.3	-0.1	9.3	1.3	
445	Guaranteed..	15.8		4.4		8.0		do.
	Found.....	16.5	0.7	4.2	-0.2	8.8	0.8	
507	Guaranteed..	15.8		4.4		8.0		do.
	Found.....	16.3	0.5	4.6	0.2	9.5	1.5	
404	Guaranteed..							do.
	Found.....	16.4		3.4		4.4		
523	Guaranteed..	14.8		4.0		9.5		Wheat bran and ground screenings.
	Found.....	15.6	0.8	4.3	0.3	8.6	-0.9	
391	Guaranteed..	14.8		4.0		9.5		do.
	Found.....	14.8	0.0	5.1	1.1	8.4	-1.1	
407	Guaranteed..	16.3		4.6		6.0		Wheat bran.
	Found.....	13.7	-2.6	4.4	0.2	8.0	2.0	
356	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.8	1.3	4.3	0.3	8.5	-1.0	
348	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.5	0.0	3.6	-1.6	8.4	-0.9	
477	Guaranteed..	14.0		4.0		11.0		do.
	Found.....	14.0	0.0	4.2	0.2	13.0	2.0	
382	Guaranteed..	14.5		4.0		10.0		do.
	Found.....	14.9	0.4	4.2	0.2	8.3	-1.7	
561	Guaranteed..	14.5		4.0		9.5		Wheat bran and ground screenings.
	Found.....	15.5	1.0	4.7	0.7	9.1	-0.4	
560	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	16.9	2.4	4.4	0.4	8.6	0.9	
352	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.3	-0.2	4.0		8.8	0.7	
522	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.8	1.3	5.1	1.1	7.7	-1.8	
323	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.1	-0.4	3.9	-0.1	8.4	-1.1	
697	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.8	0.3	4.1	0.1	9.9	0.4	
588	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	16.3	1.8	4.3	0.3	9.4	-0.1	
622	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	16.3	1.8	4.3	0.3	8.0	-1.5	
627	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.8	1.3	4.5	0.5	8.8	-0.7	
690	Guaranteed..	14.5		4.0		9.5		Wheat bran.
	Found.....	15.1	0.6	4.0	0.0	9.1	-0.4	
686	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.4	-0.1	4.0	0.0	8.9	-0.6	
366	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	13.6	-0.9	3.7	-0.3	9.0	-0.5	
628	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.6	1.1	4.5	0.5	8.7	-0.8	
552	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	16.4	1.9	5.0	1.0	9.8	0.3	

## WHEAT BRAN, WHEAT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
358	Pure Wheat Bran.....	Lynchburg Milling Co., Lynchburg, Va.	Job P. Wyatt & Son Co., Raleigh.	June 25, '14	100	\$1.70
361	do.....	do.....	Crowder & Rand, Raleigh.	June 25, '14	100	1.65
364	do.....	do.....	Poole & Hobby Bros., Raleigh.	June 25, '14	100	1.65
563	Wheat Bran.....	Louisville Milling Co., Louisville, Ky.	D. L. Gore Co., Wilming- ton.	Feb. 12, '15	100	1.60
635	Pure Wheat Bran.....	J. D. Manner & Co., New Market, Va.	S. J. Adams, Raleigh.....	Mar. 3, '15	100	1.60
637	do.....	do.....	Job P. Wyatt & Son Co., Raleigh.	Mar. 3, '15	100	1.60
430	Wheat Bran.....	Mayo Milling Co., Rich- mond, Va.	New Bern Hay & Grain Co., New Bern.	Nov. 7, '14	100	1.60
559	Pure Wheat Bran.....	Middle Tennessee Milling Co., Tullahoma, Tenn.	J. W. Brooks, Wilmington.	Feb. 12, '15	100	1.60
386	do.....	Mountain City Mill Co., Chattanooga, Tenn.	Asheville Grocery Co., Asheville.	July 23, '14	75	1.10
603	do.....	do.....	Patterson Co., Greensboro	Feb. 18, '15	100	1.50
698	do.....	do.....	J. H. Poole, Raleigh.....	July 12, '15	100	....
631	do.....	do.....	W. A. Myatt, Raleigh.....	Mar. 2, '15	100	1.60
638	do.....	do.....	Job P. Wyatt & Son Co.,	Mar. 3, '15	100	1.60
543	do.....	do.....	John S. McEachern & Sons, Wilmington.	Feb. 11, '15	100	1.55
432	Seal of Minnesota Wheat Bran.	New Prague Flouring Mill Co., New Prague, Minn.	C. L. Spencer, New Bern....	Nov. 14, '15	100	1.75
570	Wheat Bran.....	Pillsbury Mills, Minne- apolis, Minn.	S. P. McNair, Wilmington.	Feb. 12, '15	100	1.60
580	do.....	do.....	Brown & Toon, Wilming- ton.	Feb. 12, '15	100	1.60
7011	do.....	do.....	W. F. Richardson, Jr., Co., Concord.	May 15, '15	100	....
380	do.....	J. S. Read, Morristown, Tenn.	Asheville Grocery Co., Asheville.	July 23, '15	75	1.35
460	do.....	do.....	Asheville Hay & Grain Co., Asheville.	Jan. 13, '15	75	1.20
400	do.....	do.....	J. E. Johnson, Asheville....	Sept. 14, '14	75	1.30
453	do.....	do.....	John T. Wilkins, Hender- son.	Jan. 12, '15	75	1.15
515	do.....	do.....	J. Q. Houston & Son, Henderson.	Feb. 3, '15	75	1.25
403	do.....	do.....	Wofford Fain Co., Murphy	Feb. 18, '15	75	1.40
437	do.....	A. D. Scott & Co., Nor- folk, Va.	C. G. Morris, Washington	Nov. 9, '14	100	1.65
346	Wheat Bran and Screen- ings.	Washburn-Crosby, Min- neapolis, Minn.	Capital Feed & Grocery Co., Raleigh.	June 25, '14	100	1.75
669	do.....	do.....	C. B. Gill & Co., Raleigh..	June 29, '15	100	....

## BRAN WITH SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
358	Guaranteed..	14.5		4.0		9.5		Wheat bran.
	Found.....	15.1	0.6	3.9	-0.1	8.1	-0.6	
361	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.0	-0.5	4.2	0.2	8.7	-0.8	
364	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.9	0.4	4.4	0.4	8.1	-1.4	
563	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.8	1.3	4.3	0.3	10.5	1.0	
635	Guaranteed..	15.8		4.0		8.0		do.
	Found.....	13.4	-2.4	4.1	0.1	10.7	2.7	
637	Guaranteed..	15.8		4.0		8.0		do.
	Found.....	15.8	0.0	4.1	0.1	9.6	1.6	
430	Guaranteed..	14.5		4.0		10.0		do.
	Found.....	15.4	0.9	3.8	-0.2	10.9	0.9	
559	Guaranteed..	14.5		5.0		9.5		do.
	Found.....	15.8	1.3	4.5	-0.5	9.2	-0.3	
386	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.3	-0.2	4.3	0.3	8.8	-0.7	
603	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	17.0	2.5	4.1	0.1	7.9	-1.6	
698	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	14.8	0.3	4.0	0.0	7.4	-2.1	
631	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.9	1.4	3.9	-0.1	6.9	-2.6	
638	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.5	1.0	4.0	0.0	7.0	-2.5	
543	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	16.8	2.3	4.1	0.1	7.3	-2.2	
432	Guaranteed..	14.6		4.8		11.0		do.
	Found.....	15.4	0.8	4.9	0.1	9.3	-1.7	
570	Guaranteed..	14.5		4.0		12.0		Wheat bran and ground screenings.
	Found.....	12.4	-2.1	4.9	0.9	13.7	1.7	
580	Guaranteed..	14.5		4.0		12.0		do.
	Found.....	12.6	-1.9	4.9	0.9	13.6	1.6	
7014	Guaranteed..	14.5		4.0		12.0		do.
	Found.....	12.0	-2.5	4.6	0.6	13.2	1.2	
380	Guaranteed..	14.5		4.0		9.5		Wheat bran.
	Found.....	15.6	1.1	5.0	1.0	8.5	-1.0	
460	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	17.0	2.5	4.8	0.8	8.2	-1.3	
400	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.5	1.0	4.8	0.8	7.8	-1.7	
453	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	16.9	2.4	4.6	0.6	8.2	-1.3	
515	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	17.3	2.8	4.7	0.7	8.5	-1.0	
403	Guaranteed..	14.5		4.0		9.5		do.
	Found.....	15.4	0.9	4.5	0.5	7.7	-1.8	
437	Guaranteed..	14.5		4.0		11.0		do.
	Found.....	16.2	1.7	4.8	0.8	9.5	-1.5	
346	Guaranteed..	14.5		4.0		12.0		Wheat bran and ground screenings.
	Found.....	14.6	0.1	3.8	-0.2	11.0	-1.0	
669	Guaranteed..	14.5		4.0		12.0		do.
	Found.....	14.9	0.4	4.7	0.7	10.0	-2.0	

## WHEAT BRAN, WHEAT

Laboratory Number	Grand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
694	Wheat Bran and Screenings.	Washburn Crosby, Minne- apolis.	C. B. Gill Co., Raleigh....	July 12, '15	100	\$....
332	do.....	do.....	Parker & Clark, High Point.	June 18, '14	100	1.80
370	Wheat Bran.....	do.....	Farm Union Agency Co., Winston.	June 16, '14	100	1.60

## RECAPITU

## Wheat Bran With and Without Screenings

Guaranteed.....  
 Found.....  
 Deficient\*.....  
 Range of deficiency.....  
 Range of excess.....  
 Average deficiency.....  
 Average excess.....

\*Deficient means below guarantee; in the case of fiber.

## BRAN WITH SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
634	{ Guaranteed..	14.5		4.0		12.0		Wheat bran and ground screenings.
	{ Found.....	14.9	0.4	4.4		10.3	-1.7	
322	{ Guaranteed..	14.5		4.0		12.0		do.
	{ Found.....	14.1	-0.4	3.9	-0.1	8.9	-3.1	
370	{ Guaranteed..	14.5		4.0		12.0		do.
	{ Found.....	15.5	1.0	4.8	0.8	9.9	-2.1	

## LATION

Protein	Fat	Fiber
14.0% to 17.0%	4.0% to 5.0%	6.0% to 12.0%
12.0% to 17.3%	3.4% to 5.1%	4.4% to 13.2%
13 or 24.0%	11 or 20.0%	37 or 69.0%
0.1% to 3.4%	0.1% to 1.6%	0.1% to 3.1%
0.0% to 2.8%	0.1% to 1.1%	0.1% to 2.7%

to be below guarantee is to be better than guarantee.

## WHEAT MIDLINGS OR SHORTS WITH

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
632	White Middlings.....	W. S. Ankeny & Co., Minneapolis, Minn.	W. A. Myatt, Raleigh.....	Mar. 2, '15	100	\$1.85
321	Pure Wheat Middlings.....	Aeme-Evans Co., Indian- apolis, Ind.	Parker & Clark, High Point.	June 18, '14	75	1.40
449	.....do.....	Ballard & Ballard Co., Louisville, Ky.	W. S. White & Co., Eliza- beth City.	Nov. 10, '14	100	1.70
443	Kentucky Farm Feed.....	.....do.....	T. P. Nash, Elizabeth City	Nov. 10, '14	100	1.75
506	Farm Feed.....	.....do.....	.....do.....	Jan. 1, '15	100	1.70
651	Brown Middlings.....	Bay State Milling Co., Minneapolis, Minn.	Roberts, Atkinson Co., Selma.	Mar. 4, '15	100	1.75
579	Standard Middlings.....	Bingham & Co., Rich- mond, Va.	G. W. Anderson, Wilming- ton.	Feb. 12, '15	.....	.....
409	Pure Wheat Shorts.....	Banner Roller Mills, Lin- colnton, N. C.	Dixie Grocery Co., Lin- colnton.	Sept. 23, '14	75	1.40
587	Cairo Wheat Middlings...	Cairo Milling Co., Cairo, Ill.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.60
390	Pure Wheat Brown Middlings.	Dunlop Milling Co., Clarksville, Tenn.	Adams Grain & Produce Co., Asheville.	July 23, '14	75	1.30
618	.....do.....	.....do.....	.....do.....	Feb. 24, '15	75	1.35
526	Middlings and Screenings	B. A. Eschart Milling Co., Chicago, Ill.	E. N. Rhodes, Hamlet.....	Feb. 9, '15	100	1.85
496	Patapseo White Middlings	C. A. Gambrell Mfg. Co., Baltimore, Md.	Kirby Woodard, Wilson....	Jan. 30, '15	75	1.60
489	.....do.....	.....do.....	Wilson Wholesale Grocery, Wilson.	Jan. 30, '15	75	1.60
487	.....do.....	.....do.....	Wells Grocery Co., Wilson..	Jan. 30, '15	75	1.65
545	Brown Middlings.....	Hecker-Jones-Jewel Mill- ing Co., New York, N.Y.	John S. McEachern & Sons, Wilmington.	Feb. 14, '15	100	1.65
550	H Middlings.....	.....do.....	The Worth Co., Wilming- ton.	Feb. 14, '15	100	1.65
557	.....do.....	.....do.....	J. W. Brooks, Wilmington..	Feb. 12, '15	100	1.65
562	.....do.....	.....do.....	The Stone Co., Wilmington	Feb. 12, '15	100	1.70
566	.....do.....	.....do.....	McNair & Pearsall, Wil- mington.	Feb. 12, '15	100	1.60
576	.....do.....	.....do.....	Hall & Pearsall, Wilming- ton.	Feb. 12, '15	100	1.60
351	Seal of Minnesota Middlings.	Hen Produce Flouring Mill Co., Minneapolis.	S. J. Adams, Raleigh .....	June 25, '14	100	1.90
513	Pure Wheat Shorts.....	Liberty Mills, Nashville, Tenn.	J. V. Houston & Son, Hendersonville.	Feb. 3, '15	75	1.35
553	.....do.....	.....do.....	Jas. H. Watters, Wilming- ton.	Feb. 11, '15	100	1.75
567	.....do.....	.....do.....	McNair & Pearsall, Wil- mington.	Feb. 12, '15	100	1.60
532	Thoroughbred Feed.....	Lexington Roller Mills Co., Lexington, Ky.	C. V. Williams, Hamlet....	Feb. 9, '15	100	1.85
658	.....do.....	.....do.....	F. B. Jones, Milton.....	Mar. 10, '15	100	1.85



## AND WITHOUT SCREENINGS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
632	{ Guaranteed..	17.9		5.0		6.0		Wheat middlings.
	{ Found.....	18.5	1.5	5.5	0.5	3.6	-2.4	
321	{ Guaranteed..	15.0		4.0		8.0		do.
	{ Found.....	17.6	2.6	4.8	0.8	7.4	-0.6	
449	{ Guaranteed..	16.5		4.6		6.4		do.
	{ Found.....	18.1	1.6	4.3	-0.3	5.9	-0.5	
443	{ Guaranteed..	16.5		4.6		6.4		Wheat middlings and ground screenings.
	{ Found.....	17.6	1.1	4.4	-0.2	6.1	-0.3	
506	{ Guaranteed..	16.5		4.6		6.4		do.
	{ Found.....	17.3	0.8	4.3	-0.3	5.8	-0.6	
651	{ Guaranteed..	14.5		4.2		9.9		Wheat middlings.
	{ Found.....	17.1	2.6	5.6	1.4	7.5	-2.4	
579	{ Guaranteed..	17.8		5.8		8.8		do.
	{ Found.....	20.0	2.2	5.4	-0.4	6.0	-2.8	
409	{ Guaranteed..	15.0		4.0		6.0		do.
	{ Found.....	16.0	1.0	4.5	0.5	6.4	0.4	
587	{ Guaranteed..	16.0		4.8		5.0		do.
	{ Found.....	18.2	2.2	4.4	-0.4	8.1	3.1	
390	{ Guaranteed..	16.3		4.6		6.0		do.
	{ Found.....	15.9	-0.4	4.3	-0.3	5.7	-0.3	
618	{ Guaranteed..	16.3		4.6		6.0		do.
	{ Found.....	15.4	-0.9	4.3	-0.3	5.4	-0.6	
526	{ Guaranteed..	14.0		4.0		7.0		Wheat middlings and ground screenings.
	{ Found.....	17.5	3.5	4.0	0.0	6.3	-0.7	
496	{ Guaranteed..	16.5		5.0		3.3		Wheat middlings.
	{ Found.....	16.1	-0.4	4.5	-0.5	3.8	0.5	
489	{ Guaranteed..	16.5		5.0		3.3		do.
	{ Found.....	17.3	0.8	5.0	0.0	4.0	0.7	
487	{ Guaranteed..	16.5		5.0		3.3		do.
	{ Found.....	16.8	0.3	4.6	-0.4	4.4	1.1	
545	{ Guaranteed..	16.5		5.4		7.7		Wheat middlings and ground screenings.
	{ Found.....	18.0	1.5	5.2	-0.2	7.2	-0.5	
550	{ Guaranteed..	16.5		4.8		8.3		do.
	{ Found.....	17.1	0.6	4.8	0.0	7.5	-0.8	
557	{ Guaranteed..	16.5		4.8		8.3		do.
	{ Found.....	17.8	1.3	5.0	0.2	7.7	-0.6	
562	{ Guaranteed..	16.5		4.8		8.3		do.
	{ Found.....	17.0	0.5	5.0	0.2	7.9	-0.4	
566	{ Guaranteed..	16.5		5.4		7.7		do.
	{ Found.....	17.5	1.0	4.9	-0.5	7.7	0.0	
576	{ Guaranteed..	16.5		5.4		7.7		do.
	{ Found.....	17.4	0.9	4.9	-0.5	8.0	0.3	
351	{ Guaranteed..	17.8		5.8		6.8		Middlings.
	{ Found.....	17.3	-0.5	5.6	-0.2	6.0	-0.8	
513	{ Guaranteed..	16.0		4.0		6.0		Shorts.
	{ Found.....	18.2	2.2	4.8	0.8	5.4	-0.6	
553	{ Guaranteed..	16.0		4.0		6.0		do.
	{ Found.....	17.3	1.3	4.2	0.2	5.5	-0.5	
567	{ Guaranteed..	16.0		4.0		6.0		do.
	{ Found.....	17.5	1.5	4.3	0.3	5.3	-0.7	
532	{ Guaranteed..	15.8		3.8		7.1		Middlings.
	{ Found.....	16.8	1.0	3.6	-0.2	6.0	-1.1	
658	{ Guaranteed..	15.8		3.8		7.1		do.
	{ Found.....	15.6	-0.2	3.9	-0.1	6.0	-1.1	

## WHEAT MIDLINGS OR SHORTS WITH

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
384	Rich Middlings.....	Model Mill Co., Johnston City, Tenn.	Asheville Grocery Co., Asheville.	July 23, '14	75	\$1.50
464	do.....	do.....	Asheville Hay & Grain Co., Asheville.	Jan. 13, '15	75	1.30
695	do.....	do.....	C. B. Gill & Co., Raleigh..	July 12, '15	100	.....
617	Wheat Middlings.....	Mayo Milling Co., Inc., Richmond, Va.	Adams Grain & Produce Co., Charlotte.	Feb. 24, '15	75	1.35
399	Winter Wheat Middlings..	National Feed Co., St. Louis, Mo.	J. E. Johnson, Asheville...	Sept. 14, '14	75	1.35
689	XX Daisy Middlings .....	Pillsbury Mills, Minne- apolis, Minn.	Madison Grocery Co., Madison.	July 6, '15	100	2.00
688	do.....	do.....	City Grocery, Madison.....	July 6, '15	100	2.00
683	do.....	do.....	J. D. Meadow Grocery Co., Madison.	July 6, '15	100	1.60
499	Daisy Middlings.....	do.....	P. L. Woodard & Co., Wilson.	Jan. 30, '15	100	2.00
473	Wheat Standard Middlings .....	do.....	H. L. Bizzell, Goldsboro...	Jan. 2, '15	100	1.65
428	do.....	do.....	New Bern Hay & Grocery Co., New Bern.	Nov. 7, '14	100	1.80
564	do.....	do.....	D. L. Gore Co., Wilming- ton.	Feb. 12, '15	100	1.70
435	Standard Middlings.....	do.....	Armstrong Grocery Co., New Bern.	Nov. 7, '14	100	1.65
440	Wheat Middlings.....	do.....	F. G. Paul & Bro., Wash- ington.	Nov. 9, '14	100	1.65
582	Pillsbury Middlings.....	Pillsbury Mills, Minne- apolis, Minn.	Love & Wood, Wilmington.	Feb. 12, '15	100	1.65
676	Pillsbury B Middlings.....	do.....	F. D. Forrester & Co., Wilkesboro.	June 15, '15	100	1.75
379	Wheat Shorts.....	J. S. Reed, Morristown, Tenn.	Asheville Grocery Co., Asheville.	July 23, '14	75	1.45
401	do.....	do.....	Wofford & Fain Co., Murphy.	Feb. 18, '15	75	1.40
514	do.....	do.....	J. O. Houston & Son, Hendersonville.	Feb. 3, '15	75	1.45
565	Pure Wheat Middlings....	Stott Milling Co., Detroit, Mich.	D. L. Gore Co., Wilming- ton.	Feb. 12, '15	100	1.75
436	do.....	S. D. Scott & Co., Nor- folk, Va.	C. D. Morris, Washing- ton.	Nov. 9, '14	100	1.65
481	do.....	Stuarts Draft Milling Co., Stuarts Draft, Va.	Farmers Cash Feed & Seed Store, Winston.	Jan. 25, '15	100	2.00
442	Stanco Wheat Middlings.	Standard Cereal Co., Chil- licothe, Ohio.	T. P. Nash, Elizabeth City	Nov. 10, '14	100	1.70
446	do.....	do.....	W. S. White & Co., Eliza- beth City.	Nov. 10, '14	100	1.70
426	Star and Crescent Middlings.	Star and Crescent Milling Co., Chicago.	Burrus & Parker, New Bern.	Nov. 19, '14	100	1.85
357	Middlings.....	Sleepy Eye Milling Co., Minneapolis, Minn.	Job P. Wyatt & Son Co., Raleigh.	June 25, '14	100	1.70
693	Wheat Standard Middlings.	Washburn-Crosby Co., Minneapolis, Minn.	C. B. Gill & Co., Raleigh..	July 7, '15	100	.....

## AND WITHOUT SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
384	Guaranteed..	15.0		4.0		7.2		Middlings.
	Found.....	16.6	0.6	3.9	-0.1	6.5	-0.7	
464	Guaranteed..	15.0		4.0		7.2		do.
	Found.....	16.6	1.6	4.7	0.7	7.1	-0.1	
695	Guaranteed..	15.0		4.0		7.2		do.
	Found.....	15.9	0.9	4.7	0.7	7.4	0.2	
617	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	16.1	1.1	4.6	0.6	9.5	1.5	
399	Guaranteed..	16.0		4.0		7.0		do.
	Found.....	15.0	-1.0	5.8	1.8	7.5	0.5	
689	Guaranteed..	17.0		4.5		4.0		Low grade wheat flour.
	Found.....	17.9	0.9	4.5	0.0	3.1	-0.9	
688	Guaranteed..	17.0		4.5		4.0		do.
	Found.....	17.8	0.8	4.1	-0.4	2.9	-1.1	
683	Guaranteed..	17.0		4.5		4.0		do.
	Found.....	18.1	1.1	4.4	-0.1	2.8	-1.2	
499	Guaranteed..	17.0		4.0		4.0		do.
	Found.....	17.0	0.0	3.6	-0.4	3.6	-0.4	
473	Guaranteed..	15.0		4.5		10.0		Middlings and ground screenings.
	Found.....	16.8	1.8	4.5	0.0	9.6	-0.4	
428	Guaranteed..	15.0		4.5		10.0		do.
	Found.....	16.3	1.3	5.0	0.5	9.9	-0.1	
564	Guaranteed..	15.0		4.0		10.0		do.
	Found.....	16.4	1.4	5.2	1.2	9.6	-0.4	
435	Guaranteed..	15.0		4.0		10.0		do.
	Found.....	17.5	2.5	4.5	0.5	9.0	-1.0	
440	Guaranteed..	15.0		4.5		10.0		do.
	Found.....	17.8	2.8	4.9	0.4	9.2	-0.8	
582	Guaranteed..	15.0		4.0		10.0		Middlings or shorts with ground screenings.
	Found.....	15.6	0.6	5.7	1.7	9.8	-0.2	
676	Guaranteed..	16.0		4.5		10.0		do.
	Found.....	15.7	-0.3	5.1	0.6	9.3	-0.7	
379	Guaranteed..	15.0		4.5		7.0		Middlings or shorts.
	Found.....	16.5	1.5	4.9	0.4	5.0	-2.0	
401	Guaranteed..	15.0		4.5		7.0		do.
	Found.....	17.4	2.4	4.3	-0.2	4.7	-2.3	
514	Guaranteed..	15.0		4.5		7.0		do.
	Found.....	17.6	2.6	4.7	0.2	4.9	-2.1	
565	Guaranteed..	17.0		5.0		7.0		do.
	Found.....	18.3	1.3	5.6	0.6	6.7	-0.3	
436	Guaranteed..	15.0		4.0		9.0		do.
	Found.....	18.0	3.0	4.5	0.5	7.5	-1.5	
481	Guaranteed..	15.0		4.0		4.0		do.
	Found.....	16.0	1.0	4.4	0.4	3.3	-0.7	
442	Guaranteed..	15.0		4.0		6.0		do.
	Found.....	16.8	1.8	4.4	0.4	6.5	0.5	
446	Guaranteed..	15.0		4.0		6.0		do.
	Found.....	18.0	3.0	4.7	0.7	5.3	-0.7	
426	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	17.3	2.3	4.8	0.8	8.8	0.8	
357	Guaranteed..	17.2		4.3		9.4		do.
	Found.....	17.6	0.4	5.1	0.8	6.3	-3.1	
693	Guaranteed..	15.0		5.0		9.5		Middlings or shorts with ground screenings.
	Found.....	15.6	0.6	5.1	0.1	9.2	-0.3	

## WHEAT MIDLINGS OR SHORTS WITH

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
668	Wheat Standard Middlings.	Washburn-Crosby Co., Minneapolis, Minn.	C. B. Gill & Co., Raleigh..	June 29, '15	100	\$1.60
684	do.....	do.....	T. D. Meadow Grocery Co., Madison.	June 6, '15	100	1.50
503	Middlings.....	do.....	New Bern Hay & Grain Co., New Bern.	Jan. 1, '15	100	1.85
324	Wheat Middlings.....	do.....	Parker & Clark, High Point.	June 18, '14	100	1.85
363	Standard Middlings.....	do.....	Poole & Hobby Bros., Raleigh.	June 25, '14	100	1.70
365	do.....	do.....	W. A. Myatt, Raleigh.....	June 25, '14	100	1.75
368	Wheat Middlings.....	do.....	Peebles Bros., Raleigh .....	June 25, '14	100	1.65

## RECAPITU

## Wheat Middlings, or Shorts, With and Without Screenings

Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber,

## AND WITHOUT SCREENINGS—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
668	{ Guaranteed..	15.0		5.0		9.5		Middlings or shorts with ground screenings.
	{ Found.....	15.9	0.9	5.1	0.1	8.9	-0.6	
684	{ Guaranteed..	15.0		5.0		9.5		do.
	{ Found.....	15.8	0.8	4.8	-0.2	8.3	-1.2	
503	{ Guaranteed..	15.0		5.0		9.5		do.
	{ Found.....	17.4	2.4	4.9	-0.1	8.3	-1.2	
324	{ Guaranteed..	15.0		5.0		9.5		do.
	{ Found.....	16.9	1.9	5.1	0.1	7.8	-1.7	
363	{ Guaranteed..	15.0		4.0		10.0		do.
	{ Found.....	15.5	0.5	4.5	0.5	9.6	-0.4	
365	{ Guaranteed..	15.0		4.0		10.0		do.
	{ Found.....	15.3	0.3	3.9	-0.1	9.2	-0.8	
368	{ Guaranteed..	14.5		4.0		12.0		do.
	{ Found.....	15.0	0.5	4.6	0.6	10.0	-2.0	

## LATION

Protein	Fat	Fibre
14.0% to 17.8%	3.8% to 5.8%	3.3% to 12.0%
15.0% to 20.0%	3.6% to 5.8%	2.8% to 10.0%
7 or 11.0%	23 or 38.0%	49 or 80.0%
0.2% to 1.0%	0.1% to 0.5%	0.0% to 3.1%
0.3% to 3.5%	0.0% to 1.7%	0.0% to 3.1%

to be below guarantee is to be better than guarantee.

## WHEAT BRAN AND SHORTS OR MIDDINGS

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
408	Pure Wheat Bran and Shorts.	Banner Roller Mills, Lin- colnton, N. C.	Dixie Grocery Co., Lin- colnton.	Sept. 23, '14	75	\$1.40
412	Bran and Shorts.....	Eagle Roller Mills, Shelby, N. C.	J. A. Webb, Shelby.....	Sept. 23, '14	75	1.40
377	Mixed Feed (Bran and Shorts).	Catawba Milling Co., Hickory, N. C.	Newton & Hamrick, Hickory.	July 21, '14	75	1.40
340	Bran and Shorts.....	Harrisonburg Milling Co., Harrisonburg, Va.	C. V. Williams & Co., Hamlet.	June 24, '14	100	1.85
610	Mixed Feed (Bran and Shorts).	Mooresville Flour Mills, Mooresville, N. C.	Harris & McNeily, Moores- ville.	Feb. 23, '15	100	1.85
456	Bran and Shorts.....	Marshall Milling Co., Marshall, N. C.	W. H. King, Henderson- ville.	Jan. 12, '15	75	1.35
406	Rich Bran and Shorts.....	Newton Roller Mills, Newton, N. C.	Beach Bros., Morganton...	Sept. 23, '14	75	1.50
373	Bran and Shorts.....	Newport Mill Co., New- port, Tenn.	City Feed Co., Hickory....	July 21, '14	75	1.40
374	do.....	Statesville Flour Mill Co., Statesville, N. C.	do.....	July 21, '14	100	1.85
396	Hog Feed.....	do.....	Overman & Co., Salisbury.	Sept. 9, '14	75	1.35
341	do.....	do.....	C. V. Williams & Co., Hamlet.	June 24, '14	100	1.85
678	do.....	do.....	Overman & Co., Salisbury	June 30, '15	75	1.35
675	do.....	do.....	Peebles Bros., Raleigh.....	June 29, '15	100	1.75
616	Star Feed (Bran and Shorts).	Star Milling Co., States- ville, N. C.	Charles Moody & Co., Charlotte.	Feb. 24, '15	75	1.35

## RECAPITU

## Wheat Bran and Shorts, With and Without Screenings

Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber,

## WITH AND WITHOUT SCREENINGS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
408	Guaranteed..	14.5		4.0		8.0		
	Found.....	15.0	0.5	5.0	1.0	5.5	-2.5	Bran and shorts.
412	Guaranteed..	14.2		4.0		5.1		
	Found.....	17.0	2.8	4.4	0.4	5.6	0.5	do.
377	Guaranteed..	13.0		3.0		9.5		
	Found.....	14.4	1.4	3.6	0.6	4.9	-4.6	do.
340	Guaranteed..	15.0		4.5		7.0		
	Found.....	17.3	2.3	4.5	0.0	5.7	1.3	do.
610	Guaranteed..	15.0		4.0		7.0		
	Found.....	14.3	-0.7	3.8	-0.2	4.7	-2.3	do.
456	Guaranteed..	15.5		4.0		9.5		
	Found.....	16.1	0.6	1.3	0.3	5.3	-4.2	do.
406	Guaranteed..	15.6		4.0		6.0		
	Found.....	14.4	-1.1	4.2	0.2	7.3	1.3	do.
373	Guaranteed..	14.5		4.0		8.0		
	Found.....	15.6	1.1	4.2	0.2	5.8	-2.2	do.
374	Guaranteed..	16.0		4.0		7.0		
	Found.....	15.5	-0.5	4.1	0.1	6.3	-0.7	do.
396	Guaranteed..	15.0		4.0		7.0		
	Found.....	14.8	-0.2	3.8	-0.2	5.6	-1.4	Bran, middlings, screenings.
341	Guaranteed..	15.0		4.0		7.0		
	Found.....	15.0	0.0	3.8	-0.2	6.1	-0.9	do.
673	Guaranteed..	15.0		4.0		7.0		
	Found.....	15.1	0.1	4.3	0.3	6.3	-0.7	do.
675	Guaranteed..	15.5		4.0		7.5		
	Found.....	15.5	0.0	4.1	0.1	6.0	-1.5	do.
616	Guaranteed..	11.6		4.4		6.5		
	Found.....	16.4	0.8	5.3	0.9	5.1	-1.4	Bran and shorts.

## LATION

Protein	Fat	Fiber
13.0% to 16.0%	3.0% to 4.5%	5.1% to 9.5%
14.3% to 17.3%	3.6% to 5.3%	4.7% to 7.3%
4 or 29.0%	3 or 21.0%	11 or 79.0%
0.2% to 1.1%	0.0% to 0.2%	0.7% to 4.6%
0.1% to 2.8%	0.1% to 1.0%	0.5% to 1.3%

to be below guarantee is to be better than guarantee.

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	SHIP	
					Claimed Weight of Package-Lbs.	Price
398	Shipstuff.....	Austin-Heaton Co., Dur- ham, N. C.	Maye & Page, Durham.....	Sept. 10, '14	100	\$1.80
613	do.....	do.....	Charles Moody & Co., Charlotte.	Feb. 24, '15	75	1.35
410	do.....	Blanton Roller Mills, Shelby, N. C.	Roberts Bros., Shelby.....	Feb. 23, '15	75	1.35
664	do.....	Dan Valley Mills, Dan- ville, Va.	W. L. Thomas, Milton.....	Mar. 10, '15	100	1.80
624	do.....	do.....	Carolina Warehouse, Greensboro.	Mar. 1, '15	100	1.70
601	do.....	do.....	The Patterson Co., Greens- boro.	Feb. 18, '15	100	1.75
519	do.....	do.....	Elmore Maxwell Co., Greensboro.	Feb. 8, '15	100	1.65
592	do.....	do.....	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.60
332	do.....	Dixie Milling Co., Burling- ton, N. C.	C. M. Coble, Burlington....	June 19, '14	100	1.80
7010	do.....	do.....	Dixie Milling Co., Burling- ton.	May 7, '15	100	1.80
326	do.....	do.....	W. A. Davis, High Point....	June 18, '14	75	1.40
641	Shipstuff (Arrow Bran)...	Dunlop Mills, Richmond, Va.	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	1.75
629	do.....	do.....	C. B. Gill & Co., Raleigh..	Mar. 2, '15	100	1.75
581	Shipstuff.....	do.....	Brown & Toon, Wilming- ton.	Feb. 12, '15	100	1.70
571	do.....	do.....	S. P. McNair, Wilmington..	Feb. 12, '15	100	1.70
330	do.....	High Point Milling Co., High Point, N. C.	M. D. Sloat, High Point....	June 18, '14	75	1.40
665	Pure Wheat Shipstuff.....	Milton Mill Co., Milton, N. C.	W. L. Thomas, Milton.....	Mar. 10, '15	100	1.75
609	Shipstuff.....	Mt. Ulla Roller Mills, Mt. Ulla, N. C.	Harris & McNeely, Moores- ville.	Feb. 23, '15	100	1.85
626	do.....	North State Milling Co., Greensboro, N. C.	R. P. Gorrell, Greensboro..	Mar. 1, '15	100	1.70
482	do.....	Piedmont Mills, Lynch- burg, Va.	Farmers Cash Feed & Seed Store, Winston.	Jan. 25, '15	100	1.80
530	Shipstuff.....	Piedmont Mills, Lynch- burg, Va.	J. W. Pegram, Hamlet.....	Feb. 9, '15	100	1.85
602	do.....	do.....	Patterson Co., Greensboro..	Feb. 18, '15	100	1.75
634	do.....	do.....	S. J. Adams, Raleigh.....	Mar. 3, '15	100	1.75
652	do.....	do.....	Capital Feed & Grocery Co., Raleigh.	Mar. 5, '15	100	1.75
317	do.....	J. Allen Smith Co., Knox- ville, Tenn.	Parker & Clark, High Point	June 18, '14	75	1.50
457	do.....	do.....	W. H. King, Henderson- ville.	Jan. 12, '15	75	1.40
604	do.....	do.....	Patterson Co., Greensboro..	Feb. 18, '15	100	1.75
625	do.....	W. A. Watson & Co., Greensboro, N. C.	Carolina Warehouse, Greensboro.	Mar. 1, '15	100	1.70



## STUFF

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
398	Guaranteed..	16.0		4.5		5.5		Shipstuff.
	Found.....	14.9	-1.1	4.3	-0.2	6.5	1.0	
613	Guaranteed..	16.0		4.5		5.5		do.
	Found.....	15.9	-0.1	4.7	0.2	4.8	-0.7	
410	Guaranteed..	14.5		4.0		4.7		do.
	Found.....	15.1	0.6	4.6	0.6	6.4	1.8	
664	Guaranteed..	16.0		5.0		8.0		do.
	Found.....	14.9	-1.1	4.6	-0.4	6.4	-1.6	
624	Guaranteed..	16.0		5.0		8.0		do.
	Found.....	14.8	-1.2	4.5	-0.5	6.5	-1.5	
601	Guaranteed..	16.0		5.0		8.0		do.
	Found.....	16.1	0.1	4.5	-0.5	6.9	-1.1	
519	Guaranteed..	16.0		5.0		8.0		do.
	Found.....	14.9	-1.1	4.3	-0.7	6.6	-1.4	
592	Guaranteed..	16.0		5.0		8.0		do.
	Found.....	17.1	1.1	4.8	-0.2	6.4	-1.6	
332	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	15.6	0.6	4.1	0.1	6.6	-1.4	
7010	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	15.4	0.4	3.8	-0.2	7.1	-0.9	
326	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	14.8	-0.2	3.9	-0.1	6.0	-2.0	
641	Guaranteed..	16.0		4.5		7.0		do.
	Found.....	15.6	-0.4	4.2	-0.3	5.6	-1.4	
629	Guaranteed..	16.0		4.5		7.0		do.
	Found.....	15.6	-0.4	4.3	-0.2	5.6	-1.4	
581	Guaranteed..	16.0		4.5		7.0		do.
	Found.....	16.6	0.6	4.3	-0.2	6.0	-1.0	
571	Guaranteed..	16.0		4.5		7.0		do.
	Found.....	16.1	0.1	4.7	0.1	5.4	-0.6	
330	Guaranteed..	15.0		4.0		6.0		do.
	Found.....	16.5	1.5	4.7	0.7	7.1	1.1	
665	Guaranteed..	16.0		5.0		6.0		do.
	Found.....	15.2	-0.8	4.2	-0.8	5.6	-0.4	
609	Guaranteed..	14.5		4.0		5.0		do.
	Found.....	13.7	-0.8	3.3	-0.7	4.3	-0.7	
626	Guaranteed..	15.9		4.0		4.0		do.
	Found.....	16.5	0.6	4.6	0.6	6.3	2.3	
482	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	15.6	0.6	4.3	0.3	6.6	-1.4	
530	Guaranteed..	15.0		4.0		3.0		do.
	Found.....	15.8	0.8	4.4	0.4	6.6	3.6	
602	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	16.0	1.0	4.5	0.5	6.8	-1.2	
634	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	14.8	-0.2	4.2	0.2	6.3	-1.7	
652	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	14.9	-0.1	4.3	0.3	6.0	-2.0	
317	Guaranteed..	15.0		4.0		7.0		do.
	Found.....	14.9	-0.1	3.4	-0.6	3.5	-3.5	
457	Guaranteed..	15.0		4.0		7.0		do.
	Found.....	17.3	2.3	4.5	0.5	6.9	-0.1	
604	Guaranteed..	14.0		4.0		7.0		do.
	Found.....	15.9	1.9	4.2	0.2	7.6	0.6	
625	Guaranteed..	15.0		4.0		8.0		do.
	Found.....	15.8	0.8	4.6	0.6	4.7	-3.3	

RECAPITU

Shipstuff
Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber,

RED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
328	Big G Red Dog Middlings	Bay State Milling Co., Minneapolis, Minn.	W. A. Davis, High Point...	June 18, '14	100	\$2.00
465	Red Dog.....	Blish Milling Co., Seymour, Ind.	Asheville Hay & Grain Co., Asheville.	Jan. 13, '15	75	1.50
660	Elmco Red Dog Flour....	Listman Mill Co., La Crosse, Wis.	F. B. Jones, Milton.....	Mar. 10, '15	100	2.00
325	Red Dog Middlings.....	Piedmont Mills, Lynchburg, Va.	Parker & Clark, High Point	June 18, '14	100	2.00
605	Star Red Dog.....	Star & Crescent Milling Co., Chicago, Ill.	Patterson Co., Greensboro	Feb. 18, '15	100	2.00
670	Adrian Red Dog.....	Washburn-Crosby, Minneapolis, Minn.	T. B. Crowder & Son, Raleigh.	June 29, '15	100	2.00
681	do.....	do.....	Overman & Co., Salisbury.	June 30, '15	100	2.10

RECAPITU

Red Dog
Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber,

## LATION

Protein	Fat	Fiber
14.0% to 16.0%	4.0% to 5.0%	4.0% to 8.0%
13.7% to 17.3%	3.3% to 4.8%	3.3% to 7.6%
13 or 46.0%	14 or 50.0%	22 or 79.0%
0.1% to 1.2%	0.1% to 0.8%	0.1% to 3.3%
0.1% to 2.3%	0.1% to 0.7%	0.6% to 3.6%

to be below guarantee is to be better than guarantee.

## DOG

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
328	{ Guaranteed..	18.0		4.0		2.5		Red dog.
	{ Found.....	17.3	-0.7	4.2	0.2	1.4	-1.1	
463	{ Guaranteed..	15.1		3.4		1.0		do.
	{ Found.....	17.0	1.9	3.7	0.3	2.1	1.1	
660	{ Guaranteed..	17.1		4.0		3.0		do.
	{ Found.....	19.0	1.9	4.7	0.7	2.3	-0.7	
325	{ Guaranteed..	15.8		4.0		2.0		do.
	{ Found.....	15.4	-0.4	4.1	0.1	1.4	-0.6	
605	{ Guaranteed..	16.0		4.0		2.0		do.
	{ Found.....	17.5	1.5	3.4	-0.6	2.7	0.7	
670	{ Guaranteed..	17.0		5.0		4.0		do.
	{ Found.....	18.9	1.9	5.4	0.4	4.2	0.2	
681	{ Guaranteed..	17.0		5.0		4.0		do.
	{ Found.....	18.5	1.5	4.9	-0.1	3.9	-0.1	

## LATION

Protein	Fat	Fiber
15.1% to 18.0%	3.4% to 5.0%	1.0% to 4.0%
15.4% to 19.0%	3.4% to 5.4%	1.4% to 4.2%
2 or 29.0%	2 or 29.0%	4 or 57.0%
0.4% to 0.7%	0.1% to 0.6%	0.1% to 1.1%
1.5% to 1.9%	0.1% to 0.7%	0.2% to 1.1%

to be below guarantee is to be better than guarantee.

## MIXED FEEDS NOT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
376	Boss Feed.....	Asheville Milling Co., Asheville, N. C.	Shell Grocery Co., Hickory	July 21, '14	75	\$1.45
385	White Feed.....	do.....	Asheville Grocery Co., Asheville.	July 23, '14	75	1.45
529	Mill Feed and Screenings..	Atlanta Milling Co., At- lanta, Ga.	R. E. Hinson, Hamlet.....	Feb. 9, '15	100	1.85
659	Red Cross Mixed Feed....	Bailey-Pleasants Co., Lynchburg, Va.	F. B. Jones, Milton.....	Mar. 10, '15	100	1.85
329	Brockett's Roller Feed....	Robert Brockett, High Point, N. C.	M. D. Stout, High Point...	June 18, '14	75	1.40
478	Colonial Horse and Mule Feed.	Colonial Cereal Co., Nor- folk, Va.	Deans & Moye Co., Golds- boro.	Jan. 1, '15	100	1.65
590	Corno Horse and Mule Feed.	Corno Mills, St. Louis, Mo.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.90
333	do.....	do.....	do.....	June 19, '14	100	1.90
502	do.....	do.....	T. P. Ashford, New Bern.	Jan. 1, '15	100	---
418	do.....	do.....	Vance County Good Roads Commission, Henderson.	Oct. 8, '14	---	---
345	do.....	do.....	Capital Feed & Grocery Co., Raleigh.	June 25, '14	100	1.80
655	Cremo Cow Chops.....	Huff & Cook, Roanoke, Va.	T. D. Meadow Grocery Co., Madison.	July 6, '15	100	2.00
439	Larrowe Dairy Feed.....	Larrowe Milling Co., De- troit, Mich.	Pappin & Woolard, Wash- ington.	Nov. 9, '14	100	1.65
591	Model Mill Feed.....	Model Mill Co., Johnson City, Tenn.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.60
533	do.....	do.....	C. V. Williams, Hamlet...	Feb. 9, '15	100	1.75
525	do.....	do.....	E. N. Rhodes, Hamlet.....	Feb. 9, '15	100	1.89
327	do.....	do.....	W. A. Davis, High Point...	June 18, '14	75	1.40
584	Pawnee Cow Feed.....	National Oats Co., St. Louis, Mo.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.65
621	Mixed Feed.....	Newport Mill Co., New- port, Tenn.	Johnstone Bros., Char- lotte.	Feb. 24, '15	75	1.35
7003	Imperial Feed.....	Newport Mill Co., Loudon, Tenn.	Dixie Milling Co., Inc., Burlington.	May 7, '15	100	1.85
455	Fine Feed or Feed Meal...	Mountain City Mill Co., Chattanooga, Tenn.	Henderson Wholesale Gro- cery Co., Henderson.	Jan. 12, '15	75	1.30
630	do.....	do.....	W. A. Myatt, Raleigh.....	Mar. 2, '15	100	1.75
480	do.....	do.....	Asheville Hay & Grain Co. Asheville.	Jan. 1, '15	75	1.20
378	do.....	do.....	Asheville Grocery Co., Asheville.	July 23, '14	75	1.40
318	do.....	do.....	Parker & Clark, High Point	June 18, '14	100	1.40
597	Schumacher Stock Feed...	Quaker Oats Co., Chicago.	Patterson Co., Greensboro	Feb. 18, '15	100	1.90

## CONTAINING MOLASSES

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
376	Guaranteed..	12.2		3.9		5.5		Wheat bran and screenings, corn meal and bran.
	Found.....	14.9	2.7	3.4	-0.5	7.5	2.0	
385	Guaranteed..	13.3		3.2		3.5		Wheat middlings, corn bran.
	Found.....	17.1	3.8	3.4	0.2	3.3	0.2	
529	Guaranteed..	13.0		4.0		9.5		Wheat and corn mill feed and screenings.
	Found.....	15.3	2.3	4.2	0.2	6.4	3.1	
659	Guaranteed..	10.0		3.0		16.0		Wheat bran, ground screenings, ground corn and cob.
	Found.....	9.4	-0.6	2.7	-0.3	15.6	-0.4	
329	Guaranteed..	15.0		4.0		7.0		Wheat bran and middlings.
	Found.....	14.5	-0.5	3.8	-0.2	5.9	-1.1	
478	Guaranteed..	10.0		2.5		13.0		Crushed corn, oats, alfalfa meal, oat middlings, oat hulls, cotton seed feed, screenings, molasses, salt.
	Found.....	9.6	-0.4	2.3	-0.2	10.2	-2.8	
590	Guaranteed..	10.0		3.5		12.0		Ground alfalfa, ground corn, C. S. meal, hominy feed, oat feed.
	Found.....	11.4	1.4	4.0	0.5	13.5	1.5	
333	Guaranteed..	10.0		3.5		12.0		do.
	Found.....	10.0	0.0	2.1	-1.4	12.2	0.2	
502	Guaranteed..	10.0		3.5		12.0		do.
	Found.....	11.0	10.0	3.6	0.1	12.0	0.0	
418	Guaranteed..	10.0		3.5		12.0		do.
	Found.....	9.9	-0.1	3.1	-0.4	11.7	-0.3	
345	Guaranteed..	10.0		3.5		12.0		do.
	Found.....	10.3	0.3	3.5	0.0	13.5	1.5	
685	Guaranteed..	18.0		4.5		5.0		Corn meal, C. S. meal, gluten feed.
	Found.....	24.1	6.1	4.8	0.3	5.9	0.9	
439	Guaranteed..	19.0		3.0		14.0		C. S. meal, corn gluten feed, dried distillers grains, dried beet pulp, wheat bran and middlings, salt.
	Found.....	20.0	1.0	3.1	0.1	11.6	-2.4	
591	Guaranteed..	14.7		4.0		7.2		Wheat shorts and bran, corn and corn offals.
	Found.....	16.0	1.3	4.1	0.1	7.3	0.1	
533	Guaranteed..	14.7		4.0		7.2		do.
	Found.....	16.0	1.3	3.6	-0.4	6.5	-0.7	
525	Guaranteed..	14.7		4.0		7.2		do.
	Found.....	15.1	0.4	3.9	-0.1	6.2	-1.0	
327	Guaranteed..	14.7		4.0		7.2		do.
	Found.....	15.3	0.6	4.5	0.5	5.8	-1.4	
584	Guaranteed..	15.0		5.0		14.0		Hominy feed, oat feed, C. S. meal, ground grain screenings.
	Found.....	14.9	-0.1	5.5	0.5	15.8	1.8	
621	Guaranteed..	13.5		4.0		8.0		Wheat bran and shorts, corn bran, ear corn, wheat and corn screenings.
	Found.....	15.4	0.9	4.6	0.6	5.9	2.1	
7003	Guaranteed..	13.0		4.0		8.0		do.
	Found.....	12.2	-0.8	4.3	0.3	14.9	6.9	
455	Guaranteed..	12.5		5.5		8.0		Wheat bran, shorts and screenings, corn hearts, hominy feed.
	Found.....	14.1	1.6	5.4	-0.1	5.7	-2.3	
630	Guaranteed..	12.5		5.5		8.0		do.
	Found.....	12.6	0.1	5.3	-0.2	5.4	-2.6	
480	Guaranteed..	12.5		5.5		8.0		do.
	Found.....	15.0	2.5	5.6	0.1	5.3	-2.7	
378	Guaranteed..	12.5		5.5		8.0		do.
	Found.....	13.5	1.0	4.1	-1.4	4.2	-3.8	
318	Guaranteed..	12.5		5.5		8.0		do.
	Found.....	12.8	0.3	3.3	-2.2	4.8	-3.2	
597	Guaranteed..	10.0		4.0		9.0		Ground corn, hominy feed, ground barley, wheat flour and middlings, C. S. meal, oatmeal mill by-products, ground puffed wheat and rice, 0.5% salt.
	Found.....	11.8	1.8	5.1	1.1	11.8	2.8	

## MIXED FEEDS NOT

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
387	Schumacher Special Horse Feed.	Quaker Oats Co., Chicago.	Rogers Wholesale Grocery, Asheville.	July 23, '14	100	\$1.80
661	Victor Feed.....	do.....	F. B. Jones, Milton.....	Mar. 10, '15	100	1.85
395	Mill Feed.....	Statesville Flour Mill, Statesville, N. C.	Overman & Co., Salisbury	Sept. 9, '14	75	1.40
679	do.....	do.....	do.....	June 30, '15	75	1.35
593	Jasco Feed.....	J. Allen Smith, Knoxville, Tenn.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.60
331	Peerless Feed.....	do.....	C. M. Coble, Burlington...	June 19, '14	100	1.80
586	do.....	do.....	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.60
650	do.....	do.....	Roberts-Atkinson Co., Selma.	Mar. 4, '15	100	1.75
403	do.....	do.....	Asheville Hay & Grain Co., Asheville.	Jan. 13, '15	75	1.25
447	Mixed Corn and Oat Feed	W. S. White & Co., Elizabeth City, N. C.	W. S. White & Co., Elizabeth City.	Nov. 10, '14	100	1.70
411	Mixed Feed.....	Moses Bros., Lexington, Va.	J. A. Webb, Shelby.....	Sept. 23, '14	100	1.80
353	Thoroughbred Feed.....	Lexington Roller Mills Co., Lexington, Ky.	S. J. Adams, Raleigh .....	June 25, '14	100	1.85
491	Patapasco Feed.....	C. A. Gambrill Mfg. Co., Baltimore.	Wilson Grocery Co., Wilson.	Jan. 30, '15	100	1.75

## RECAPITU

## Mixed Feeds Without Molasses

Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber

## CONTAINING MOLASSES—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
357	{ Guaranteed... Found.....	10.0 9.8	—0.2	4.0 3.6	0.4	8.0 5.4	—2.6	Ground corn, crushed oats, C. S. meal, oatmeal mill by-products, 0.5% salt.
661	{ Guaranteed... Found.....	10.0 9.2	—0.8	4.0 2.6	—1.4	9.0 11.2	2.2	Ground corn, crushed oats, C. S. meal, wheat flour, oatmeal mill by-products, 0.5% salt.
395	{ Guaranteed... Found.....	15.5 16.2	0.7	4.0 3.8	—0.2	7.0 4.3	—2.7	Wheat shorts and screenings, corn bran and screenings.
679	{ Guaranteed... Found.....	15.5 14.0	—0.5	4.0 0.1	0.1	7.0 6.8	—0.2	do.
593	{ Guaranteed... Found.....	14.5 15.3	0.8	4.0 4.4	0.4	8.0 6.6	—1.4	Wheat bran and shorts, corn meal and bran, wheat and corn screenings.
331	{ Guaranteed... Found.....	14.0 13.3	—0.7	4.0 5.7	1.7	7.0 5.7	—1.3	do.
586	{ Guaranteed... Found.....	14.0 15.4	1.4	4.0 3.2	—0.8	7.0 5.8	—1.2	do.
650	{ Guaranteed... Found.....	14.0 15.5	1.5	4.0 4.3	0.3	7.0 6.8	—0.2	do.
463	{ Guaranteed... Found.....	14.0 14.9	0.9	4.0 4.3	0.3	7.0 6.5	—0.5	do.
447	{ Guaranteed... Found.....	9.4 8.9	—0.5	4.4 4.9	0.5	3.3 3.7	—0.3	do.
411	{ Guaranteed... Found.....	14.5 14.1	—0.4	4.0 3.3	—0.7	9.5 5.6	—3.9	Wheat middlings and bran, corn
353	{ Guaranteed... Found.....	15.8 15.8	0.0	3.8 3.7	—0.1	7.1 5.5	—1.6	do.
491	{ Guaranteed... Found.....	14.3 13.1	—1.2	4.0 3.6	—0.4	5.0 5.7	—0.7	Wheat products.

## LATION

Protein	Fat	Fiber
9.4% to 18.0%	2.5% to 5.5%	3.3% to 16.0%
8.9% to 24.0%	2.1% to 5.7%	3.3% to 15.8%
13 or 33.0%	18 or 46.0%	25 or 64.0%
0.1% to 1.2%	0.1% to 2.2%	0.3% to 3.9%
0.1% to 6.1%	0.1% to 1.7%	0.1% to 6.9%

to be below guarantee is to be better than guarantee.

## MIXED FEEDS CON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
471	American Special Horse and Mule Feed.	American Feed Milling Co., Asheville, N. C.	American Feed Milling Co., Asheville.	Jan. 13, '15	100	1.70
467	Carolina Special.....	do.....	do.....	Jan. 13, '15	100	1.70
468	Big Chief Horse and Mule Feed.	do.....	do.....	Jan. 13, '15	100	1.70
469	Champion Dairy Feed.....	do.....	do.....	Jan. 13, '15	100	1.40
470	Craggy Dairy Feed.....	do.....	do.....	Jan. 13, '15	100	1.30
596	Tip Top Sugar Feed.....	American Milling Co., Peoria, Ill.	Patterson Co., Greensboro	Feb. 18, '15	100	1.60
595	Sucrene Horse and Mule Feed.	do.....	do.....	Feb. 18, '15	100	1.60
645	do.....	do.....	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	1.85
646	Sucrene Horse and Mule Feed with Alfalfa.	do.....	do.....	Mar. 3, '15	100	1.90
644	Sucrene Dairy Feed.....	do.....	do.....	Mar. 3, '15	100	1.75
349	do.....	American Milling Co., Chicago, Ill.	S. J. Adams, Raleigh	June 25, '14	100	1.85
383	Allneeda Horse and Mule Feed.	Allneeda Mills Co., East St. Louis, Ill.	Asheville Grocery Co., Asheville.	July 23, '14	100	1.85
417	Alfalco Horse and Mule Feed.	Colonial Cereal Co., Norfolk, Va.	Vance County Good Roads Com., Henderson.	Oct. 8, '14	100	1.75
360	Colonial Horse and Mule Feed.	do.....	Crowder & Rand, Raleigh.	June 25, '14	100	1.75
577	Royal Palm Molasses Feed.	Cairo Milling Co., Cairo, Ill.	G. W. Anderson, Wilming- ton.	Feb. 12, '15	100	1.70
452	Velvet Molasses Feed	do.....	John F. Wilkins, Hender- sonville.	Jan. 12, '15	100	1.70
517	do.....	do.....	Elmore Maxwell Co., Greensboro.	Feb. 8, '15	100	1.60
699	Little Ned's Sweet Feed...	Edgar Morgan Co., Mem- phis, Tenn.	C. B. Gill & Co., Raleigh..	July 13, '15	100	1.75
497	Old Beck Sweet Feed	do.....	Kirby Woodard Wilson	Jan. 30, '15	100	1.85
466	Gem Sweet Dairy Feed.....	do.....	Asheville Hay & Grain Co., Asheville.	Jan. 13, '15	100	1.60
636	Balfalfa.....	Dabney Brokerage Co., Norfolk, Va.	S. J. Adams, Raleigh	Mar. 3, '15	100	1.85
556	do.....	do.....	F. E. Hashagan, Wilming- ton.	Feb. 11, '15	100	1.70
536	do.....	do.....	C. V. Williams, Hamlet...	Feb. 9, '15	100	1.70
475	do.....	do.....	Ray Dawson, Kinston.....	Jan. 23, '15	100	1.65
476	Fullpail Dairy Feed.....	do.....	do.....	Jan. 23, '15	100	1.65
486	Mascot Feed.....	do.....	Wells Grocery Co., Wilson..	Jan. 30, '15	100	1.85
535	do.....	do.....	C. V. Williams, Hamlet....	Feb. 9, '15	100	1.85



## TAINING MOLASSES

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
471	Guaranteed..	10.0		3.0		14.0		Corn, oat clips, C. S. meal, alfalfa, cane molasses, salt.
	Found.....	12.1	0.1	3.9	0.9	8.0	-6.0	
467	Guaranteed..	11.0		4.0		7.5		Corn, oats, alfalfa meal, C. S. meal, cane molasses, salt.
	Found.....	14.1	3.1	2.5	-1.5	9.3	1.8	
468	Guaranteed..	10.0		3.5		7.5		
	Found.....	11.3	1.3	3.1	-0.4	5.5	-2.0	Corn, oats, alfalfa meal, cane molasses, salt.
469	Guaranteed..	24.5		5.3		8.5		Corn meal, alfalfa meal, wheat bran, C. S. meal, cane molasses, salt.
	Found.....	23.6	-0.9	4.2	-1.1	9.1	0.6	
470	Guaranteed..	16.3		3.5		15.0		C. S. meal, oat clips, by-products, alfalfa, bran, cane molasses, salt.
	Found.....	19.8	3.5	3.6	0.1	10.8	-4.2	
596	Guaranteed..	12.0		2.5		12.0		Ground and bolted grain screenings, clipped oat by-product, C. S. meal, molasses, salt.
	Found.....	16.6	4.6	3.5	1.0	11.3	-0.7	
595	Guaranteed..	9.0		2.5		12.0		Clipped oat by-product, molasses, corn, oats, salt.
	Found.....	8.9	-0.1	2.3	-0.2	8.3	-3.7	
645	Guaranteed..	9.0		2.5		12.0		
	Found.....	9.0	0.0	2.4	-0.1	9.5	-2.5	do.
646	Guaranteed..	10.0		2.5		12.0		
	Found.....	10.5	0.5	2.1	-0.4	13.2	-1.2	Alfalfa, barley, molasses, corn, oats, salt.
644	Guaranteed..	16.5		3.5		12.0		Molasses, clipped oat by-product, C. S. meal, linseed meal, corn gluten feed, ground and bolted grain screenings, salt.
	Found.....	17.1	0.6	3.5	0.0	11.7	-0.3	
349	Guaranteed..	16.5		3.5		12.0		
	Found.....	15.1	-1.4	3.2	-0.3	14.2	2.2	do.
383	Guaranteed..	9.0		3.0		12.0		
	Found.....	11.1	1.1	2.3	-0.7	13.5	1.5	Corn, oats, alfalfa, molasses, salt.
417	Guaranteed..	10.0		2.8		13.0		Alfalfa, cracked corn, oats, molasses, salt, wheat, oat hulls, screenings.
	Found.....	10.6	0.6	2.2	-0.6	7.0	6.0	
360	Guaranteed..	10.0		2.5		13.0		
	Found.....	10.8	0.8	2.5	0.0	10.2	3.2	Alfalfa, cracked corn, oats, oat hulls, molasses.
577	Guaranteed..	10.0		2.5		12.0		
	Found.....	10.4	0.4	3.0	0.5	11.0	-1.0	Corn, oat feed, alfalfa, grain screenings, molasses.
452	Guaranteed..	10.0		2.5		12.0		
	Found.....	10.3	0.3	2.6	0.1	13.0	1.0	Corn, oat feed, alfalfa meal, molasses.
517	Guaranteed..	10.0		2.5		12.0		
	Found.....	10.1	0.1	2.5	0.0	9.5	-2.5	do.
699	Guaranteed..	9.0		1.5		12.0		
	Found.....	9.4	0.4	1.6	0.1	11.0	-1.0	Alfalfa meal, corn, cane molasses.
497	Guaranteed..	10.0		2.5		12.0		
	Found.....	11.6	1.6	2.6	0.1	12.0	0.0	Alfalfa, oats, corn, cane molasses.
466	Guaranteed..	16.0		2.0		15.0		Alfalfa, brews grains, bran, C. S. meal, cane molasses.
	Found.....	18.6	2.6	3.0	1.0	15.6	0.6	
636	Guaranteed..	10.0		3.0		12.0		
	Found.....	9.7	-0.3	2.6	-0.4	9.7	-2.3	Alfalfa, corn, oats, molasses.
556	Guaranteed..	10.3		3.0		12.0		
	Found.....	10.1	0.2	2.6	-0.4	9.9	-2.1	do.
536	Guaranteed..	10.0		3.0		12.0		
	Found.....	10.3	0.3	2.3	-0.7	10.4	-1.6	do.
475	Guaranteed..	10.0		3.0		12.0		
	Found.....	9.9	-0.1	2.5	-0.5	9.7	-2.3	do.
476	Guaranteed..	12.0		2.5		15.0		Cottonseed meal, wheat bran, oat feed, corn meal, molasses.
	Found.....	16.1	4.1	3.5	1.0	10.6	-4.4	
486	Guaranteed..	10.0		4.0		13.0		
	Found.....	10.9	0.9	3.9	-0.1	13.9	0.9	Alfalfa, corn, peanut meal, bran, molasses.
535	Guaranteed..	10.0		4.0		13.0		
	Found.....	10.0	0.0	3.4	-0.6	12.5	-0.5	Alfalfa, corn, oats, molasses.

## MIXED FEEDS CON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
589	Alaseo Sweet Feed.....	Corno Mills Co., St. Louis, Mo.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	\$1.75
540	Excello Horse Feed.....	Excello Feed Co., St. Joseph, Mo.	John S. McEachern & Sons, Wilmington.	Feb. 11, '15	100	1.90
541	Reliable Horse & Mule Feed.	do.....	do.....	Feb. 11, '15	100	1.85
655	do.....	do.....	Capital Feed Co., Raleigh.	Mar. 5, '15	100	1.75
654	Sho-Me Horse and Mule Feed.	do.....	do.....	Mar. 5, '15	100	1.75
415	Besto Molasses Feed.....	J. T. Gibbons, New Or- leans, La.	Seaboard Feed & Produce Co., Henderson.	Oct. 8, '14	100	1.75
531	do.....	do.....	J. W. Pegram, Hamlet.....	Feb. 9, '15	100	2.00
441	do.....	do.....	F. G. Paul & Bros., Washington.	Nov. 9, '14	100	1.75
548	Puritan Horse and Mule Feed.	Golden Grain Milling Co., East St. Louis, Ill.	Worth Co., Wilmington.....	Feb. 11, '15	100	1.65
549	Golden Grain Horse and Mule Feed.	do.....	do.....	Feb. 11, '15	100	1.75
547	Golden Grain Dairy Feed.	do.....	do.....	Feb. 11, '15	100	1.50
504	do.....	do.....	New Bern Hay, Grain & Feed Co., New Bern.	Jan. 20, '15	100	1.90
429	do.....	do.....	do.....	Nov. 7, '14	100	1.60
362	Champion Brand Horse and Mule Feed.	Henderson Grain & Feed Co., Henderson, N. C.	Crowder & Rand, Raleigh.	June 25, '14	100	1.75
671	do.....	do.....	T. B. Crowder & Son, Raleigh.	June 29, '15	100	1.75
419	do.....	do.....	Henderson Grain & Feed Co., Henderson.	Oct. 8, '14	100	1.90
369	Star Feed.....	Illinois Feed Mills, St. Louis, Mo.	Peebles Bros., Raleigh.....	June 25, '14	100	1.75
392	Dan Patch.....	International Sugar Feed No. 2 Co., Memphis, Tenn.	Adams Grain & Produce Co., Asheville.	July 23, '14	100	1.75
402	do.....	do.....	Wofford Fain Co., Murphy	Sept. 18, '14	100	2.25
427	do.....	do.....	Burrus & Parker, New Bern.	Nov. 7, '14	100	2.00
371	Jewell Horse & Mule Feed.	do.....	City Feed Co., Hickory.....	July 21, '14	100	1.55
438	Little Jo Horse Feed.....	Just Mills, Nashville, Tenn.	Pippin & Woolard, Wash- ington.	Nov. 9, '14	100	1.65
677	Just Horse Feed.....	do.....	F. D. Forester & Co., Wilkesboro.	June 15, '15	100	2.00
682	Mistletoe Molasses Feed ..	John E. Koerner & Co., New Orleans, La.	T. D. Meadow Grocery Co., Madison.	July 6, '15	100	1.65
344	Molaseo Cow Feed.....	National Oats Co., St. Louis, Mo.	Capital Feed & Grocery Co., Raleigh.	June 25, '14	100	1.90
653	Molaseo.....	do.....	do.....	Mar. 5, '15	100	1.75
585	do.....	do.....	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.75

## TAINING MOLASSES—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
589	Guaranteed..	10.0		1.0		20.0		
	Found.....	11.5	1.5	.8	-0.2	22.3	2.3	Ground alfalfa, molasses.
540	Guaranteed..	10.0		3.0		15.0		Alfalfa, corn clips, oats, linseed meal, molasses,
	Found.....	11.5	1.5	2.4	-0.6	11.0	-4.0	salt.
541	Guaranteed..	10.0		3.0		15.0		
	Found.....	12.6	2.6	2.5	-0.5	13.5	-1.5	do.
655	Guaranteed..	10.0		3.0		15.0		
	Found.....	10.6	0.6	3.0	0.0	12.1	-2.9	do.
654	Guaranteed..	9.0		2.0		17.0		
	Found.....	10.6	1.6	1.5	-0.5	14.0	-3.0	Alfalfa, corn, oats, molasses, salt.
415	Guaranteed..	10.0		3.5		12.0		Crushed oats, cracked corn, alfalfa meal, molasses,
	Found.....	10.0	0.0	2.1	-1.4	9.8	-2.2	salt.
531	Guaranteed..	10.0		3.5		12.0		
	Found.....	10.5	0.5	3.2	-0.3	8.4	-3.6	do.
441	Guaranteed..	10.0		3.5		12.0		
	Found.....	11.0	1.0	2.4	1.1	9.7	-2.3	do.
548	Guaranteed..	9.0		1.5		12.0		
	Found.....	10.1	1.1	2.7	2.2	11.0	-1.0	Alfalfa, corn, oats, molasses.
549	Guaranteed..	10.0		2.0		12.0		
	Found.....	11.4	1.4	2.4	0.4	12.8	0.8	do.
547	Guaranteed..	16.5		3.5		12.0		Alfalfa, C. S. meal, clipped oat by-product, mo-
	Found.....	16.8	0.3	2.6	-0.9	11.8	-0.2	lasses.
504	Guaranteed..	11.0		2.0		15.0		
	Found.....	9.8	-1.2	1.7	-0.3	13.2	-1.8	Alfalfa, corn meal, molasses.
129	Guaranteed..	11.0		2.0		15.0		
	Found.....	10.6	-0.4	1.4	-0.6	12.6	-2.4	do.
362	Guaranteed..	10.0		3.0		12.0		
	Found.....	11.4	1.4	2.3	-0.7	12.8	0.8	Cracked corn and oats, alfalfa, molasses.
671	Guaranteed..	10.0		2.8		12.0		Cracked corn, crushed oats, alfalfa, C. S. meal,
	Found.....	10.6	0.6	3.6	0.8	9.3	-2.7	molasses.
419	Guaranteed..	10.0		3.0		12.0		
	Found.....	10.2	0.2	1.9	-1.1	13.4	1.4	Cracked corn, crushed oats, alfalfa meal, molasses.
369	Guaranteed..	9.0		1.5		12.0		
	Found.....	8.1	-0.9	2.4	0.5	7.6	-4.4	Cracked corn, oats, alfalfa meal, molasses.
392	Guaranteed..	9.0		2.3		12.5		
	Found.....	9.7	0.7	1.4	-0.9	11.2	-1.3	do.
402	Guaranteed..	9.0		2.3		12.5		
	Found.....	10.4	1.4	1.9	-0.4	12.2	-0.3	do.
427	Guaranteed..	9.0		2.3		12.5		
	Found.....	10.3	1.3	1.6	-0.7	12.7	0.2	do.
371	Guaranteed..	9.0		2.0		12.5		
	Found.....	10.4	1.4	1.9	-0.1	11.3	-1.2	do.
438	Guaranteed..	9.0		1.5		12.0		
	Found.....	11.3	2.3	1.6	0.1	14.7	2.7	Cracked corn, oats, alfalfa meal, molasses, salt.
677	Guaranteed..	10.0		2.0		11.0		
	Found.....	9.5	-0.5	2.7	0.7	9.4	-1.6	do.
682	Guaranteed..	10.0		3.5		12.0		Cracked corn, oats, alfalfa meal, molasses, C. S.
	Found.....	11.7	1.7	2.2	-1.3	12.4	0.4	meal, rice bran, palm meal, oat clips, salt.
344	Guaranteed..	15.0		6.0		14.0		
	Found.....	15.6	0.6	4.5	-1.5	14.9	0.9	
653	Guaranteed..	10.0		2.5		12.0		Alfalfa, corn, oatfeed, C. S. meal, ground screen-
	Found.....	10.9	0.9	2.3	-0.2	13.4	1.4	ings, molasses.
585	Guaranteed..	10.0		2.5		12.0		
	Found.....	10.3	0.3	3.1	0.6	14.0	2.0	do.

## MIXED FEEDS CON

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
501	Molasco.....	National Oats Co., St. Louis, Mo.	T. P. Ashford, New Bern...	Jan. 26, '15	100	\$....
662	Sugarato Dairy Feed.....	Northwestern Milling Co., Winona, Minn.	F. B. Jones, Milton.....	Mar. 10, '15	100	1.75
673	Purina Dairy Feed.....	Purina Mills, St. Louis, Mo.	Peebles Bros., Raleigh .....	June 29, '15	100	1.60
512	do.....	do.....	J. O. Houston & Sons, Hendersonville.	Feb. 3, '15	100	1.90
495	do.....	Ralston Purina Mills, St. Louis, Mo.	Kirby Woodard, Wilson.....	Jan. 30, '15	100	1.90
672	Star Feed.....	do.....	Peebles Bros., Raleigh .....	June 29, '15	100	1.85
524	do.....	do.....	E. N. Rhodes, Hamlet.....	Feb. 9, '15	100	2.00
367	Nutriline Stock Feed.....	Nutriline Milling Co., Crowley, La.	W. A. Myatt, Raleigh.....	June 25, '14	100	1.75
381	Crown Horse Feed.....	G. E. Patterson & Co., Memphis, Tenn.	Asheville Grocery Co., Asheville.	July 23, '14	100	1.85
687	Arab Horse Feed.....	M. C. Peters Mill Co., Omaha, Neb.	City Grocery Co., Madi- son.	July 6, '15	100	2.00
462	do.....	do.....	Asheville Hay & Grain Co., Asheville.	Jan. 1, '15	100	1.80
479	King Corn.....	do.....	H. L. Bizzell, Goldsboro...	Jan. 1, '15	100	1.75
492	Big Mule Molasses Feed ..	Quaker Oats Co., Chicago, Ill.	Wilson Grocery Co., Wilson.	Jan. 30, '15	100	1.80
416	Green Cross Horse Feed.....	do.....	Seaboard Feed & Pro- duce Co., Henderson.	Oct. 8, '14	100	1.75
546	do.....	do.....	John S. McEachern & Sons, Wilmington.	Feb. 11, '15	100	1.85
573	do.....	do.....	The Corbett Co., Wil- mington.	Feb. 12, '15	100	1.70
388	do.....	do.....	Rogers Grocery Co., Ashe- ville.	July 23, '14	100	1.90
608	Green Cross Molasses Feed.	do.....	The Patterson Co., Greensboro.	Feb. 18, '15	100	.....
606	Golden Sweet Molasses Feed.	do.....	do.....	Feb. 18, '15	100	1.65
607	Mogul Molasses Feed.....	do.....	do.....	Feb. 18, '15	100	1.75
393	Supreme Horse and Mule Feed.	Superior Feed Co., Mem- phis, Tenn.	Adams Grain & Produce Co., Asheville.	July 23, '14	100	1.75
424	do.....	do.....	do.....	Oct. 15, '14	100	1.80
483	Turner's Molasses Feed...	W. H. Turner, Winston- Salem, N. C.	Farmers Cash Feed & Seed Seed Store, Winston.	Jan. 25, '15	100	1.90
413	Molasses Horse and Mule Feed.	J. H. Wilkes & Co., Nashville, Tenn.	J. A. Webb, Shelby.....	Sept. 23, '14	100	1.85

## TAINING MOLASSES—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
501	Guaranteed..	10.0		2.5		12.0		Alfalfa, corn, oatfeed, C. S. meal, ground screenings, molasses.
	Found.....	9.3	-0.7	2.7	-0.2	11.9	-0.1	
662	Guaranteed..	16.3		3.5		14.0		C. S. meal, flax bran, malt sprouts, wheat screenings, molasses, salt.
	Found.....	16.5	0.2	3.0	-0.5	14.5	0.5	
673	Guaranteed..	20.0		3.8		15.0		C. S. meal, brewers grains, cornfeed meal, alfalfa, molasses, salt.
	Found.....	22.0	2.0	4.2	0.4	14.8	-0.2	
	Guaranteed..	20.0		3.8		15.0		
512	Found.....	25.4	5.4	4.2	0.4	13.7	-1.3	do.
	Guaranteed..	20.0		3.8		15.0		
495	Found.....	23.0	3.0	3.7	-0.1	16.5	1.5	do.
	Guaranteed..	9.0		1.5		12.0		
672	Found.....	9.6	0.6	2.4	0.9	10.2	-1.8	Cracked corn, whole oats, alfalfa, molasses.
	Guaranteed..	9.0		1.5		12.0		
524	Found.....	10.0	1.0	2.5	1.0	9.1	-0.9	do.
	Guaranteed..	10.0		3.5		12.0		
367	Found.....	11.4	1.4	3.0	-0.5	8.0	-4.0	Corn, alfalfa, C. S. meal, rice bran, molasses.
	Guaranteed..	9.0		2.0		12.0		
381	Found.....	11.4	2.4	2.6	0.6	13.5	1.5	Corn, alfalfa, oats, molasses.
	Guaranteed..	9.0		2.0		15.0		
687	Found.....	10.3	1.3	2.2	0.2	10.0	-5.0	do.
	Guaranteed..	10.0		2.0		15.0		
462	Found.....	12.0	2.0	3.1	1.1	11.5	-3.5	do.
	Guaranteed..	10.0		1.5		18.0		
479	Found.....	11.4	1.4	2.8	1.3	10.5	-7.5	do.
	Guaranteed..	10.0		3.0		15.0		
492	Found.....	11.5	1.5	2.5	-0.5	12.2	-2.8	Molasses, crushed oats, cracked corn, alfalfa, ground grain screenings, oat meal mill by-products.
	Guaranteed..	10.0		2.5		12.0		
416	Found.....	10.7	0.7	2.1	-0.4	9.9	-2.1	Alfalfa, ground corn, crushed oats, cotton seed, meal, oatmeal mill by-products, molasses.
	Guaranteed..	10.0		2.5		12.0		
546	Found.....	10.0	0.0	2.1	-0.4	12.6	0.6	do.
	Guaranteed..	10.0		2.5		12.0		
573	Found.....	10.4	0.4	2.5	0.0	12.5	0.5	do.
	Guaranteed..	10.0		2.5		12.0		
388	Found.....	10.8	0.8	2.7	0.2	9.4	-2.6	do.
	Guaranteed..	10.0		2.0		12.0		
608	Found.....	11.0	1.0	3.5	1.5	10.7	1.3	do.
	Guaranteed..	9.0		2.0		15.0		
606	Found.....	11.3	2.3	2.2	0.2	13.3	1.7	C. S. meal, alfalfa, ground corn, oatmeal mill by-products, molasses.
	Guaranteed..	10.0		3.0		15.0		
607	Found.....	10.5	0.5	2.6	-0.4	12.3	-0.7	Molasses, crushed oats, cracked corn, alfalfa, ground grain, screenings, oatmeal mill by-products.
	Guaranteed..	11.0		2.5		12.0		
393	Found.....	11.1	0.1	3.3	0.8	8.5	-3.5	Corn, alfalfa, oats, molasses.
	Guaranteed..	11.0		2.5		12.0		
424	Found.....	11.3	0.3	3.1	0.6	8.1	-3.9	do.
	Guaranteed..	10.0		2.0		12.0		
483	Found.....	10.9	0.9	2.1	0.1	13.7	1.6	do.
	Guaranteed..	10.0		2.1		12.0		
413	Found.....	11.1	1.1	2.9	0.8	8.3	-3.7	do.

## RECAPITU

## Mixed Feeds With Molasses

Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber,

## POULTRY

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
461	Log Cabin Scratch Feed	American Feed Milling Co., Asheville, N. C.	American Feed Milling Co., Asheville.	Jan. 13, '15	100	\$2.05
600	Cluck-Cluck Scratch Feed	American Milling Co., Peoria, Ill.	Patterson Co., Greensboro	Feb. 18, '15	100	2.25
493	Aunt Patsy's Poultry Feed.	Aunt Patsy Poultry Feed Co., Memphis, Tenn.	Wilson Grocery Co., Wilson.	Jan. 30, '15	100	2.75
451	Eg-A-Day Meat.....	J. J. Badenock Co., Chicago, Ill.	L. R. Stricker, Asheville...	Dec. 10, '14	100	2.60
450	Scratch Feed.....	do.....	do.....	Dec. 10, '14	100	2.40
518	Prize Poultry Feed.....	Cairo Milling Co., Cairo, Ill.	Elmore, Maxwell Co., Greensboro.	Feb. 8, '15	100	2.00
656	Corno Hen Feed.....	Corno Mills Co., St. Louis, Mo.	Capital Feed & Grocery Co., Raleigh.	Mar. 5, '15	100	2.25
648	Cypher's Developing Food.	Cypher's Incubator Co., Buffalo, N. Y.	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	2.50
649	Cypher's Chick Food.....	do.....	do.....	Mar. 3, '15	100	2.75
620	Pine Tree Chick Feed.....	Albert Dickenson Co., Chicago, Ill.	Adams Grain & Produce Co., Charlotte.	Feb. 24, '15	100	2.30
619	Pine Tree Scratch Feed.....	do.....	do.....	Feb. 24, '15	100	2.25
485	Cackle Hen Feed.....	Dabney Brokerage Co., Newport News, Va.	Wells Grocery Co., Wilson...	Jan. 30, '15	100	2.30
431	Star Hen Feed.....	do.....	New Bern Hay & Grain Co., New Bern.	Nov. 7, '11	100	2.25
494	Gem Scratch Feed.....	Edgar-Morgan Co., Memphis, Tenn.	Kirby Woodard, Wilson...	Jan. 30, '15	100	2.25
336	Eadam Scratch Feed.....	Easley-Daniel Co., Cincinnati, O.	Merchants Supply Co., Burlington.	June 19, '14	.....	.....
375	do.....	do.....	City Feed Co., Hickory...	July 21, '14	100	2.25
342	Hen-Cackle Laying Food	Hen-Cackle Poultry Supply Co., Raleigh, N. C.	C. V. Williams & Co., Hamlet.	June 24, '14	100	2.75
647	do.....	Job P. Wyatt & Sons Co., Raleigh, N. C.	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	2.75

## LATION

Protein	Fat	Fiber
9.0% to 24.5%	1.0% to 6.0%	7.5% to 20.0%
8.1% to 25.4%	0.8% to 4.5%	5.5% to 22.3%
10 or 12.0%	32 or 39.0%	50 or 61.0%
0.1% to 1.4%	0.1% to 1.5%	0.1% to 7.5%
0.1% to 5.4%	0.1% to 2.2%	0.2% to 6.0%

to be below guarantee is to be better than guarantee.

## FEED

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
461	Guaranteed..	10.5		4.3		4.0		Cracked corn, wheat oats, Kaffir corn, sunflower seed.
	Found.....	11.1	0.6	4.3	0.0	4.0	0.0	
600	Guaranteed..	10.0		2.5		5.0		
	Found.....	11.9	1.9	3.2	0.7	2.7	-2.3	Cracked corn, wheat, barley, sunflower seed.
493	Guaranteed..	16.9		5.4		7.3		Cracked corn, oats, alfalfa, meat scrap, oyster shell.
	Found.....	15.3	-1.6	3.1	-2.3	5.0	-2.3	
451	Guaranteed..	15.0		4.0		8.0		Corn feed meal, cracked corn bran, oil meal, alfalfa, beef scrap, C. S. meal, shells.
	Found.....	16.5	1.5	4.9	0.9	4.9	-3.1	
450	Guaranteed..	10.0		2.5		5.0		Cracked corn, oats, barley, sunflower seed, Kaffir, buckwheat.
	Found.....	11.9	1.9	2.9	0.4	2.7	-2.3	
518	Guaranteed..	10.0		3.5		6.0		
	Found.....	11.6	1.6	3.0	-0.5	3.7	-2.3	Wheat, cracked corn, sunflower seed.
636	Guaranteed..	10.0		3.5		5.0		Wheat, cracked corn, milo maize, sunflower seed, Kaffir corn.
	Found.....	11.0	1.0	3.2	-0.3	2.0	-3.0	
648	Guaranteed..	10.0		3.0		3.2		
	Found.....	11.5	1.5	2.6	-0.4	1.8	-1.4	Wheat, cracked corn, buckwheat, Kaffir corn.
649	Guaranteed..	10.0		3.0		3.2		
	Found.....	11.5	1.5	2.7	-0.3	2.0	-1.2	Wheat, cracked corn, millet, oats, Kaffir corn.
620	Guaranteed..	10.0		2.5		5.0		
	Found.....	9.8	-0.2	3.7	-1.2	2.4	-2.6	Wheat, cracked corn, millet, Kaffir corn.
619	Guaranteed..	10.0		2.5		5.0		Wheat, cracked corn, rye, barley, buckwheat, Kaffir corn.
	Found.....	10.6	0.6	3.1	0.6	2.1	-2.9	
485	Guaranteed..	10.0		3.6		4.0		Wheat, cracked corn, barley, oats, Kaffir corn, sunflower seed.
	Found.....	11.5	1.5	3.5	-0.1	2.8	-1.2	
431	Guaranteed..	10.0		3.1		4.0		
	Found.....	11.3	1.3	3.4	0.3	3.1	-0.9	Wheat, cracked corn, oats, crushed oyster shell.
494	Guaranteed..	10.0		3.5		4.0		
	Found.....	10.6	0.6	3.3	-0.2	2.2	-1.8	Wheat, cracked corn, oats, sunflower seed
336	Guaranteed..	10.0		2.5		5.0		
	Found.....	10.6	0.6	2.7	0.2	2.9	-2.1	Wheat, cracked corn, oats, sunflower seed.
375	Guaranteed..	10.0		2.5		5.0		
	Found.....	11.1	1.1	2.4	-0.1	3.1	-1.9	Cracked corn, oats, sunflower seed.
342	Guaranteed..	20.0		3.9		9.3		Wheat bran, white middlings, oats, beef scrap, C. S. meal, oyster shell, corn meal, cracked corn, alfalfa, charcoal, mustard, salts, sulphur, salt.
	Found.....	22.6	2.6	3.1	0.8	5.9	-3.4	
647	Guaranteed..	23.5		5.0		8.0		
	Found.....	19.7	-3.8	4.2	-0.8	7.7	-0.3	do.

## POULTRY

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
612	Little Jo Scratch Food	Just Mills, Nashville, Tenn.	Harris & McNeely, Moores- ville.	Feb. 23, '15	100	\$2.25
583	Nutro Hen Feed	National Oats Co., St. Louis, Mo.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	2.25
343	Nutro Hen Feed	National Oats Co., St. Louis, Mo.	Capital Feed & Grocery Co., Raleigh.	June 25, '14	100	2.25
657	do	do	do	Mar. 5, '15	100	2.25
598	Red Ribbon Scratch Feed	Park & Pollard Co., Bos- ton, Mass.	Patterson Co., Greensboro	Feb. 18, '15	100	2.25
599	Scratch Feed	do	do	Feb. 18, '15	100	2.50
335	Purina Chicken Chowder Feed.	Purina Mills, St. Louis, Mo.	Merchants Supply Co., Burlington.	June 19, '14	100	2.50
615	do	do	Chas. Moody Co., Char- lotte.	Feb. 21, '15	100	2.35
674	Purina Scratch Feed	do	Peebles Bros., Raleigh	June 29, '15	100	2.25
516	Regal Scratch Feed	Ralston-Purina Co., St. Louis, Mo.	Elmore Maxwell Co., Greensboro.	Feb. 8, '15	100	2.10
574	Big Egg Scratch Feed	Quaker Oats Co., Chi- cago, Ill	Corbett Co., Wilmington	Feb. 12, '15	100	2.30
569	do	do	McNair & Pearsall, Wil- mington.	Feb. 12, '15	100	2.30
542	Big Egg Scratch Grains	do	John S. McEachern & Sons, Wilmington.	Feb. 11, '15	100	2.35
575	Quaker Chick Feed	do	Corbett Co., Wilmington	Feb. 12, '15	100	2.40
614	Domino Scratch Feed	Standard Feed Mills, Mem- phis, Tenn.	Charles Moody Co., Char- lotte.	Feb. 24, '15	100	2.25
414	Challenge Hen Feed	Superior Feed Co., Mem- phis, Tenn.	J. A. Webb, Shelby	Sept. 23, '14	100	2.00

## RECAPITU

## Poultry Feed

Guaranteed	.....
Found	.....
Deficient*	.....
Range of deficiency	.....
Range of excess	.....
Average deficiency	.....
Average excess	.....

\*Deficient means below guarantee; in the case of fiber.



## FEED—Continued

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
612	Guaranteed..	9.0		3.0		4.0		
	Found.....	10.8	1.8	3.2	0.2	2.6	-1.4	Wheat, cracked corn, oats, sunflower seed, grit.
583	Guaranteed..	10.0		3.5		5.0		
	Found.....	10.9	0.9	3.7	0.2	2.7	-2.3	Wheat, cracked corn, Kaffir corn, wild buckwheat.
343	Guaranteed..	10.0		3.5		5.0		
	Found.....	11.5	1.5	1.6	-1.9	2.9	-2.1	Wheat, cracked corn, milo maize, sunflower seed.
657	Guaranteed..	10.0		3.5		5.0		
	Found.....	11.0	1.0	2.9	-0.6	2.0	-3.0	do.
598	Guaranteed..	10.0		3.5		5.0		
	Found.....	11.3	1.3	3.1	-0.4	2.8	-2.2	Wheat, cracked corn, barley, Kaffir corn.
599	Guaranteed..	10.0		3.5		5.0		
	Found.....	11.5	1.5	3.8	0.3	2.9	-2.1	Wheat, cracked corn, buckwheat, milo maize, oats.
335	Guaranteed..	17.0		3.0		9.0		Wheat middlings and bran, corn meal, alfalfa meal,
	Found.....	19.3	2.3	3.8	0.8	7.8	-1.2	linseed meal, granulated meat, salt.
615	Guaranteed..	17.0		3.0		9.0		
	Found.....	20.8	3.8	4.0	1.0	7.4	-1.6	do.
674	Guaranteed..	11.0		3.0		4.0		Scratch size wheat and corn, barley, Kaffir, milo
	Found.....	11.5	0.5	2.7	-0.3	2.2	-1.8	maize, sunflower seed.
516	Guaranteed..	10.0		3.0		6.0		Scratch size wheat, corn, barley, Kaffir or milo
	Found.....	10.5	0.5	3.0	0.0	3.0	-3.0	maize, re-cleaned wheat screenings.
574	Guaranteed..	10.0		2.5		5.0		Cracked corn, wheat, oats, sunflower seed, barley,
	Found.....	10.5	0.5	2.8	0.3	2.6	-2.4	Kaffir, buckwheat.
569	Guaranteed..	10.0		2.5		5.0		
	Found.....	11.3	1.3	3.8	1.3	3.2	-1.8	do.
542	Guaranteed..	10.0		2.5		5.0		Cracked corn, wheat, oats, sunflower seeds, barley,
	Found.....	11.5	1.5	3.2	0.7	3.1	-1.9	Kaffir, re-cleaned wheat screenings, oyster shells or marble.
575	Guaranteed..	10.0		2.0		5.0		
	Found.....	10.4	0.4	3.0	1.0	2.5	-2.5	Cracked corn, millet seed, oat meal.
614	Guaranteed..	10.0		2.5		4.5		
	Found.....	10.0	0.0	4.3	1.8	2.6	-1.9	Cracked corn, wheat, oats, sunflower seed.
414	Guaranteed..	10.0		3.5		4.5		
	Found.....	9.6	-0.4	2.5	-1.0	2.1	-2.4	Cracked corn, wheat, oats, sunflower seed.

## LATION

Protein	Fat	Fiber
9.0% to 23.5%	2.0% to 5.4%	3.2% to 9.3%
9.6% to 22.6%	1.6% to 4.9%	1.8% to 7.8%
4 or 12.0%	15 or 38.0%	33 or 97.0%
0.2% to 3.8%	0.1% to 2.3%	0.3% to 3.4%
0.4% to 3.8%	0.2% to 1.3%	0.0% to 0.0%

to be below guarantee is to be better than guarantee.

## COTTON SEED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
454	Cotton Seed Meal.....	Campobello Oil Mill, Campobello, S. C.	Hendersonville Grocery Co., Hendersonville.	Jan. 12, '15	100	\$1.30
510	do.....	Eastern Cotton Oil Co., Hertford, N. C.	T. P. Nash, Elizabeth City	Jan. 30, '15		
474	do.....	Lenoir Oil & Seed Co., Kinston, N. C.	Copeland Bros., Kinston	Jan. 23, '15	100	
505	do.....	New Bern Cotton Oil & Fertilizer Mills, New Bern,	C. L. Spencer, New Bern	Jan. 26, '15	100	1.45
6678	do.....	Raleigh Cotton Oil Co., Raleigh, N. C.	W. A. Myatt, Raleigh	Mar. 2, '15	100	1.45
527	do.....	Southern Cotton Oil Co., Charlotte, N. C.	E. N. Rhodes, Hamlet	Feb. 9, '15	100	1.65
594	do.....	Union Seed & Fertilizer Co., Raleigh, N. C.	Merchants Supply Co., Burlington.	Feb. 18, '15	100	1.60
538	do.....	Union Seed & Fertilizer Co., Wilmington, N. C.	John S. McEachern & Sons, Wilmington.	Feb. 18, '15	100	1.50
611	do.....	Buckeye Cotton Oil Co., Cincinnati, Ohio.	Harris & McNeely, Moores- ville.	Feb. 23, '15	100	1.55
511	do.....	Cherokee Commission Co., Gaffney, S. C.	J. O. Houston & Son, Hendersonville.	Feb. 3, '15	100	1.45
680	do.....	Cleveland Oil & Fertil- izer Co., Cleveland, N. C.	Overman & Co., Salisbury	June 30, '15	100	1.50
421	do.....	Southern Cotton Oil Co., Charlotte, N. C.	Farmers Union Agency Co., Winston-Salem.	Oct. 12, '14	100	1.60
422	do.....	do.....	T. M. Benton, Winston- Salem.	Oct. 12, '14	100	1.70
423	do.....	do.....	Peeler Co., Salisbury	Oct. 13, '14	100	1.65
420	do.....	do.....	Winston Grain Co., Wins- ton-Salem.	Oct. 10, '14	100	1.50
520	do.....	do.....	Elmore Maxwell Co., Greensboro.	Feb. 8, '15	100	1.50
472	do.....	Southern Cotton Oil Co., Goldsboro, N. C.	H. L. Bizzell, Goldsboro	Jan. 21, '15	100	1.40
500	do.....	Southern Cotton Oil Co., Wilson, N. C.	P. L. Woodard & Co., Wilson.	Jan. 30, '15	100	1.30
640	do.....	Union Seed & Fertilizer Co., Raleigh.	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	1.60
405	do.....	do.....	Slayden-Fakes & Co., Bryson.	Sept. 18, '14		

## RECAPITU

## Cotton Seed Meal

Guaranteed.....  
 Found.....  
 Deficient\*.....  
 Range of deficiency.....  
 Range of excess.....  
 Average deficiency.....  
 Average excess.....

\*Deficient means below guarantee; in the case of fiber.

## MEAL

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
454	Guaranteed.....	38.56						Cotton seed meal.
	Found.....	40.25	1.68	7.7		9.3		
510	Guaranteed.....	38.56						do.
	Found.....	39.38	0.82	7.2		9.4		
474	Guaranteed.....	38.56						do.
	Found.....	41.00	2.44	8.1		8.5		
505	Guaranteed.....	38.56						do.
	Found.....	38.75	0.19	7.3		11.1		
6678	Guaranteed.....	38.56						do.
	Found.....	41.70	2.14	7.5		9.6		
527	Guaranteed.....	38.56						do.
	Found.....	43.00	4.44	8.7		7.7		
594	Guaranteed.....	38.56						do.
	Found.....	39.50	0.94	7.4		10.0		
538	Guaranteed.....	38.56						do.
	Found.....	40.12	1.56	7.1		10.4		
611	Guaranteed.....	38.56						Cotton seed meal (not standard).
	Found.....	34.44	-4.14	5.5		14.0		
511	Guaranteed.....	38.56		8.0		8.0		do.
	Found.....	37.16	-1.40	7.0	-1.0	11.7	3.7	
680	Guaranteed.....	38.56						do.
	Found.....	37.31	-1.27	6.5		10.8		
421	Guaranteed.....	38.56						do.
	Found.....	35.06	-3.50					
422	Guaranteed.....	38.56						do.
	Found.....	36.62	-1.94					
423	Guaranteed.....	38.56						do.
	Found.....	33.69	-4.87					
420	Guaranteed.....	38.56						do.
	Found.....	34.69	-3.87					
520	Guaranteed.....	38.56						do.
	Found.....	37.94	-0.62					
472	Guaranteed.....	38.56						do.
	Found.....	37.50	-1.06	8.9		12.1		
500	Guaranteed.....	38.56						do.
	Found.....	37.12	-1.44	7.6		11.7		
640	Guaranteed.....	38.56						do.
	Found.....	36.38	-2.18	6.9		9.9		
405	Guaranteed.....							do.
	Found.....	38.00		6.8		9.1		

## LATION

Protein	Fat	Fiber
38.56%		
33.7% to 43.0%	5.5% to 8.9%	7.7% to 14.0%
11 or 58.0%		
0.6% to 4.0%		
0.2% to 4.0%		

to be below guarantee is to be better than guarantee.

COTTON SEED

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
334	Cyclone Cotton Seed Feed	American Cotton Hull & Fiber Co., Memphis, Tenn.	Merchants Supply Co., Burlington, N. C.	June 19, '14	100	\$1.50
354	Gilt Edge Cotton Seed Feed.	Empire Cotton Oil Co., Atlanta, Ga.	Job P. Wyatt & Sons Co., Raleigh.	June 25, '14	100	1.65
319	Durham Brand Cotton Seed Feed.	Florida Cotton Oil Co., Jacksonville, Fla.	Parker & Clark, High Point.	June 18, '14	100	1.65
458	Cotton Seed Feed.....	Planters Oil Mill, Blacks- burg, S. C.	W. H. King, Henderson- ville.	Jan. 12, '15	100	1.35
459	do.....	do.....	Asheville Hay & Grain Co., Asheville.	Jan. 13, '15	100	1.33
320	Creamo Brand Cotton Seed Feed.	Tennessee Fiber Co., Mem- phis, Tenn.	Parker & Clark, High Point.	June 18, '14	100	1.60
692	do.....	do.....	Madison Grocery Co., Madison.	July 6, '15	100	1.60
572	do.....	do.....	S. P. McNair, Wilmington.	Feb. 12, '15	100	1.30
568	do.....	do.....	McNair & Pearsall, Wil- mington.	Feb. 12, '15	100	1.30
551	do.....	do.....	Jas. H. Waters, Wilming- ton.	Feb. 11, '15	100	1.30

RECAPITU

Cotton Seed Feed

Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber,

## FEED

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
334	{ Guaranteed..	20.0		3.0		23.0		
	{ Found.....	20.5	0.5	3.5	0.5	23.2	0.2	Cotton seed meal and hulls.
354	{ Guaranteed..	38.0		6.0		8.0		
	{ Found.....	36.3	-1.7	4.1	-1.9	11.8	3.8	Pressed cotton seed.
319	{ Guaranteed..	25.0		6.0		20.0		
	{ Found.....	24.1	-0.9	5.2	-0.8	15.4	-4.6	Cotton seed meal and hulls.
458	{ Guaranteed..	36.0		7.5		12.0		
	{ Found.....	42.9	6.9	8.4	0.9	7.5	-4.5	do.
459	{ Guaranteed..	36.0		7.5		12.0		
	{ Found.....	38.8	2.8	7.7	0.2	11.3	-0.7	do.
320	{ Guaranteed..	20.0		5.0		22.0		
	{ Found.....	19.6	-0.4	3.6	-1.4	22.1	0.1	Cotton seed meal, cotton seed hull bran
692	{ Guaranteed..	20.0		5.0		22.0		
	{ Found.....	22.9	2.9	4.0	-1.0	21.9	-0.1	do.
572	{ Guaranteed..	20.0		5.0		22.0		
	{ Found.....	22.9	2.9	4.2	-----	23.2	1.2	do.
563	{ Guaranteed..	20.0		5.0		22.0		
	{ Found.....	23.5	3.5	4.6	-0.4	21.1	-0.9	do.
551	{ Guaranteed..	20.0		5.0		22.0		
	{ Found.....	23.6	3.6	4.9	0.1	21.9	-0.1	do.

## LATION

Protein	Fat	Fiber
20.0% to 38.0%	3.0% to 7.5%	8.0% to 23.0%
19.6% to 42.9%	3.5% to 8.4%	7.5% to 23.2%
3 or 30.0%	5 or 50.0%	6 or 60.0%
0.4% to 1.7%	0.4% to 1.9%	0.1% to 4.6%
0.5% to 6.9%	0.1% to 0.9%	0.1% to 3.8%
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to be below guarantee is to be better than guarantee.

## CORN, CRACKED CORN,

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package-Lbs.	Price
7016	Corn.....	Adams Grain & Provision Co., Charlotte, N. C.	Adams Grain & Provision Co., Charlotte.	May 27, '15	75	\$1.30
554	Cracked Corn.....	Boney & Harper Milling Co., Wilmington, N. C.	Jas. H. Watters, Wilming- ton.	Feb. 11, '15	75	1.50
643	do.....	Dabney Brokerage Co., Newport News, Va.	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	.....
539	Pure Cracked Corn.....	John S. McEachern & Sons, Wilmington, N. C.	John S. McEachern & Sons, Wilmington.	Feb. 11, '15	75	1.50
434	Cracked Corn.....	C. L. Spencer, New Bern, N. C.	C. L. Spencer, New Bern..	Nov. 7, '14	100	1.95
425	do.....	S. D. Scott & Co., Nor- folk, Va.	Burrus & Parker, New Bern.	Nov. 7, '14	100	1.95
394	do.....	Geo. T. Sullivan, Kinston, N. C.	Geo. T. Sullivan, Kinston	Aug. 3, '14	96	1.80
448	do.....	W. S. White & Co., Eliza- beth City, N. C.	W. S. White & Co., Eliza- beth City.	Nov. 10, '14	100	1.65
508	do.....	do.....	do.....	Jan. 30, '15	100	1.60
537	Corn Chops.....	Boney & Harper Milling Co., Wilmington, N. C.	John S. McEachern & Sons, Wilmington.	Feb. 11, '15	100	1.50
555	do.....	do.....	Jas. H. Watters, Wilming- ton.	Feb. 11, '15	100	1.60
555	do.....	do.....	J. W. Brooks, Wilmington.	Feb. 12, '15	100	1.50

## RECAPITU

## Corn. Cracked Corn

Guaranteed.....  
 Found.....  
 Deficient\*.....  
 Range of deficiency.....  
 Range of excess.....

## Corn Chops

Guaranteed.....  
 Found.....  
 Deficient\*.....  
 Range of deficiency.....  
 Range of excess.....

\*Deficient means below guarantee; in the case of fiber,

## CORN CHOPS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
7016	Guaranteed.....							Cracked corn.
	Found.....	10.4		3.9		2.5		
	Guaranteed.....	6.5		4.0		2.5		
554	Found.....	8.9	2.4	4.9	0.9	2.0	-0.5	do.
	Guaranteed.....	8.0		3.0		4.0		
643	Found.....	9.3	1.3	3.9	0.9	1.5	-2.5	do.
	Guaranteed.....	10.3		5.1		2.3		
539	Found.....	11.0	0.7	5.5	0.4	2.3	0.0	do.
	Guaranteed.....	10.0		4.0		3.5		
434	Found.....	9.5	-0.5	4.0	0.0	1.8	-1.7	do.
	Guaranteed.....	8.0		3.0		4.0		
425	Found.....	9.9	1.9	5.6	2.6	2.4	-1.6	do.
	Guaranteed.....	8.0		3.0				
394	Found.....	9.2	1.2	2.5	-0.5	1.5		do.
	Guaranteed.....	8.8		4.5		2.0		
448	Found.....	8.6	0.2	5.1	0.6	1.9	-0.1	do.
	Guaranteed.....	8.8		4.5		2.0		
508	Found.....	7.5	1.3	4.0	0.5	1.6	-0.4	do.
	Guaranteed.....	10.0		6.8		7.2		
537	Found.....	9.1	-0.9	6.6	-0.2	7.2	0.6	Corn chops.
	Guaranteed.....	10.0		6.8		7.8		
555	Found.....	8.3	1.7	6.9	0.1	9.1	1.3	do.
	Guaranteed.....	10.0		6.8		7.8		
558	Found.....	10.0	0.0	6.5	-0.3	5.2	-2.6	do.

## LATION

Protein	Fat	Fiber
6.5% to 10.3%	3.0% to 4.5%	2.0% to 4.0%
7.5% to 11.0%	2.5% to 5.5%	1.5% to 2.5%
1 or 11.0%	1 or 11.0%	6 or 66.0%
0.5% to 0.5%	0.5% to 0.5%	0.1% to 2.5%
0.2% to 2.4%	0.4% to 2.6%	0.0% to 0.0%
10.0% to 10.0%	6.8% to 8.8%	7.2% to 7.8%
8.3% to 10.0%	6.5% to 6.9%	5.2% to 9.1%
1 or 33.0%	2 or 66.0%	1 or 33.0%
0.9% to 0.9%	0.2% to 0.3%	2.6% to 2.6%
1.7% to 1.7%	0.1% to 0.1%	1.3% to 1.3%

to be below guarantee is to be better than guarantee.

## RICE PRODUCTS,

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
498	Rice Polish.....	Carolina Rice Mills, Golds- boro, N. C.	P. L. Woodard & Co., Wilson.	Jan. 30, '15	100	\$1.60
433	Rice Meal.....	do.....	C. L. Spencer, New Bern.	Nov. 7, '14	100	1.60
623	do.....	Empire Rice Mill Co., New Orleans, La.	Carolina Warehouse, Greensboro.	Mar. 1, '15	150	2.25
488	Carolina Rice Meal.....	West Point Mill Co., Charleston, S. C.	Wells Grocery Co., Wilson.	Jan. 30, '15	100	2.00
490	do.....	do.....	Wilson Grocery Co., Wil- son.	Jan. 30, '15	100	1.90
528	Rye Middlings.....	Lynchburg Milling Co., Lynchburg, Va.	R. E. Hinson, Hanlet.	Feb. 9, '15	100	1.85
663	do.....	Cobb & Crews Co., Dan- ville, Va.	W. L. Thomas, Wilson.	Mar. 10, '15	100	1.75

## RECAPITU

## Rice Products

Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess.....

\*Deficient means below guarantee; in the case of fiber,



## RYE MIDLINGS

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
498	{ Guaranteed..	11.5		7.0		2.0		Pure rice products.
	{ Found.....	9.7	-1.8	7.1	0.1	1.3	-0.7	
433	{ Guaranteed..	11.5		8.5		11.5		Rice meal.
	{ Found.....	12.8	1.3	11.4	2.9	10.8	-0.7	
623	{ Guaranteed..	11.0		8.0		11.0		Rice bran, rice polish.
	{ Found.....	11.0	0.0	9.2	1.2	9.9	-1.1	
488	{ Guaranteed..	11.0		8.0		11.0		Rice bran and meal, rice polish and siftings.
	{ Found.....	11.0	0.0	8.8	0.8	8.5	-2.5	
490	{ Guaranteed..	11.0		8.0		11.0		do.
	{ Found.....	11.0	0.0	9.2	1.2	9.1	-1.9	
528	{ Guaranteed..	16.0		3.0		6.0		
	{ Found.....	16.6	0.6	3.5	0.5	5.5	-0.5	
663	{ Guaranteed..	10.0		3.0		6.0		
	{ Found.....	15.1	5.1	3.5	0.5	6.2	0.2	

## LATION

Protein	Fat	Fiber
11.0% to 11.5%	7.0% to 8.5%	2.0% to 11.5%
9.7% to 12.8%	7.1% to 11.4%	1.3% to 10.8%
1 or 20.0%	0 or 0.0%	5 or 100.0%
0.0% to 1.8%	0.0% to 0.0%	0.7% to 2.5%
0.0% to 1.3%	0.1% to 2.9%	0.0% to 0.0%
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to be below guarantee is to be better than guarantee.

BEET

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
509	Dried Beet Pulp.....	Hottelet & Co., Milwau- kee, Wis.	T. P. Nash, Elizabeth City.	Jan. 30, '15	100	\$1.65
534	do.....	Larrow Milling Co., De- troit, Mich.	C. V. Williams, Hamlet...	Feb. 9, '15	100	1.75
696	do.....	do.....	Peebles Bros., Raleigh...	July 12, '15	100	....
639	do.....	Michigan Sugar Co., De- troit, Mich.	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	1.75
355	do.....	Charles Pope, Riverdale, Ill.	do.....	June 25, '14	100	1.65
339	do.....	do.....	C. V. Williams, Hamlet...	June 24, '14	100	1.85
489	do.....	do.....	Elmore-Maxwell Co., Greensboro.	Jan. 25, '15	100	1.75

RECAPITU

Beet Pulp

Guaranteed.....
Found.....
Deficient*.....
Range of deficiency.....
Range of excess.....
Average deficiency.....
Average excess .....

\*Deficient means below guarantee; in the case of fiber,

CALF MEAL, MEAT MEAL, BEEF SCRAP,

Laboratory Number	Brand Name from Label	Manufacturer or Wholesaler	Retailer	Date of Collection	Claimed Weight of Package—Lbs.	Price
666	Blatchford's Calf Meal	Blatchford Calf Meal Fac- tory, Waukegan, Ill.	Elmore Maxwell Co., Greensboro.	Mar. 24, '15	100	\$4.00
667	do.....	do.....	John D. Earle Feed Co., Asheville.	Mar. 31, '15	100	4.00
372	Darlings Beef Scrap....	Van Iderstine Co., Long Island City, N. Y.	City Feed Co., Hickory...	July 21, '14	100	3.25
642	Rarva Meat Meal.....	Richmond Abattoir, Rich- mond, Va.	Job P. Wyatt & Sons Co., Raleigh.	Mar. 3, '15	100	4.25
521	Dewey's Queen Distillers Dried Grains.	Dewey Bros. Co., Blan- chester, O.	Elmore Maxwell Co., Greensboro.	Feb. 8, '15	100	1.55
544	Diamond Hog Meal.....	Corn Products Refining Co., New York, N. Y.	John S. McEachern & Sons, Wilmington.	Feb. 11, '15	100	1.90

## PULP

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
509	Guaranteed.....	8.0		0.5		20.0		Beet pulp.
	Found.....	8.0	0.0	0.5	0.0	19.3	-0.7	
534	Guaranteed.....	8.0		0.5		20.0		do.
	Found.....	8.1	0.1	0.4		19.5	-0.5	
696	Guaranteed.....	9.0		0.5		18.0		do.
	Found.....	8.1	0.9	0.9	0.4	18.1	0.1	
639	Guaranteed.....	8.0		0.5		20.0		do.
	Found.....	8.1	0.1	0.9	0.4	19.1	-0.9	
355	Guaranteed.....	8.0		0.5		20.0		do.
	Found.....	7.7	-0.3	0.6	-0.1	14.9	-5.1	
339	Guaranteed.....	8.0		0.5		20.0		do.
	Found.....	8.1	0.1	1.1	0.6	16.9	-3.1	
489	Guaranteed.....	8.0		0.5		20.0		do.
	Found.....	9.5	1.5	0.1	-0.1	19.7	-0.3	

## LATION

Protein	Fat	Fiber
8.0% to 9.0%	0.5% to 0.5%	18.0% to 20.0%
7.7% to 9.5%	0.4% to 1.1%	14.9% to 19.7%
1 or 14.0%	2 or 28.0%	6 or 86.0%
0.0% to 0.3%	0.1% to 0.1%	0.3% to 5.1%
0.1% to 1.5%	0.4% to 0.6%	0.1% to 0.1%

to be below guarantee is to be better than guarantee.

## BREWERS' GRAINS, HOG MEAL

Laboratory Number	Guaranteed and Found	Protein, Per Cent	Discrepancy	Fat, Per Cent	Discrepancy	Fiber, Per Cent	Discrepancy	Ingredients
666	Guaranteed.....	24.0		5.0		5.0		Locust bean meal, unpressed flaxseed, wheat flour, barley meal, ground beans and peas, old process oil meal, cocoa shell meal, coconut meal, re-cleaned cotton seed meal, dried milk, fenugreek, rice polish, anise, salt.
	Found.....	23.3	-0.7	5.0	0.0	6.3	1.3	
667	Guaranteed.....	24.0		5.0		5.0		do.
	Found.....	23.8	-0.2	6.1	1.1	6.5	1.5	
372	Guaranteed.....	45.0		9.0		3.0		do.
	Found.....	49.5	4.5	9.5	0.5	2.9	-0.1	
642	Guaranteed.....	85.0		7.0		0.5		do.
	Found.....	82.6	-2.4	6.4	-0.6	0.6	0.1	
521	Guaranteed.....	16.0		4.0		8.0		do.
	Found.....	14.7	-1.3	7.0	3.0	12.6	4.6	
544	Guaranteed.....	18.0		6.5		13.0		do.
	Found.....	23.5	5.5	10.1	3.6	8.6	-4.4	



## LEAF TOBACCO REPORT FOR AUGUST, 1915.

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Pounds sold for producers.....	6,588,761
Pounds sold for dealers.....	643,166
Pounds sold for warehouses.....	407,795
Total .....	<u>7,639,722</u>

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## LEAF TOBACCO REPORT FOR YEAR. AUGUST, 1914- AUGUST, 1915.

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Pounds sold for producers.....	203,787,202
Pounds sold for dealers.....	13,259,032
Pounds sold for warehouses.....	13,288,210
Total .....	<u>230,334,444</u>



**THE BULLETIN**  
**OF THE**  
**NORTH CAROLINA**  
**DEPARTMENT OF AGRICULTURE**  
**RALEIGH**

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Vol. 36, No. 11

NOVEMBER, 1915

Whole No. 214

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- I. ANALYSES OF FERTILIZERS { FALL SEASON, 1914.  
SPRING SEASON, 1915.
- II. ANALYSES OF COTTON-SEED MEAL.

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of June 6, 1900.

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EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS

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\*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In coöperation with Bureau of Plant Industry, United States Department of Agriculture.



## LETTER OF TRANSMITTAL

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HON. W. A. GRAHAM,

*Commissioner of Agriculture.*

SIR:—I submit herewith analyses of fertilizers and cotton-seed meal made in the laboratory of samples collected during the past fall and spring. These analyses show fertilizers and meals to be about as heretofore, and to be, generally, what was claimed for them. I recommend that it be issued as the November BULLETIN.

Very respectfully,

B. W. KILGORE,

*State Chemist.*

Approved for printing:

W. A. GRAHAM,

*Commissioner.*



# I. ANALYSES OF FERTILIZERS, FALL SEASON, 1914; SPRING SEASON, 1915.

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BY B. W. KILGORE,

W. G. HAYWOOD, J. Q. JACKSON, E. S. DEWAR, J. R. MULLEN AND E. B. HART.

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The analyses presented in this BULLETIN are of samples collected by the fertilizer inspectors of the Department, under the direction of the Commissioner of Agriculture, during fall months of 1914 and the spring months of 1915. They should receive the careful study of every farmer in the State who uses fertilizers, as by comparing the analyses in the BULLETIN with the claims made for the fertilizers actually used, the farmer can know by or before the time fertilizers are put in the ground whether or not they contain the fertilizing constituents in the amounts they were claimed to be present.

## TERMS USED IN ANALYSES.

*Water-soluble Phosphoric Acid.*—Phosphate rock, as dug from the mines, mainly in South Carolina, Florida, and Tennessee, is the chief source of phosphoric acid in fertilizers.

In its raw, or natural, state the phosphate has three parts of lime united to the phosphoric acid (called by chemists tricalcium phosphate). This is very insoluble in water and is not in condition to be taken up readily by plants. In order to render it soluble in water and fit for plant food, the rock is finely ground and treated with sulphuric acid, which acts upon it in such a way as to take from the three-lime phosphate two parts of its lime, thus leaving only one part of lime united to the phosphoric acid. This one-lime phosphate is what is known as water-soluble phosphoric acid.

*Reverted Phosphoric Acid.*—On long standing some of this water-soluble phosphoric acid has a tendency to take lime from other substances in contact with it, and to become somewhat less soluble. This latter is known as reverted or gone-back phosphoric acid. This is thought to contain two parts of lime in combination with the phosphoric acid, and is thus an intermediate product between water-soluble and the original rock.

Water-soluble phosphoric acid is considered somewhat more valuable than reverted, because it becomes better distributed in the soil as a consequence of its solubility in water.

*Available Phosphoric Acid* is made up of the water-soluble and reverted; it is the sum of these two.

*Water-soluble Ammonia.*—The main materials furnishing ammonia in fertilizers are nitrate of soda, sulphate of ammonia, cotton-seed meal, dried blood, tankage, and fish scrap. The first two of these (nitrate of soda and sulphate of ammonia) are easily soluble in water and become well distributed in the soil where plant roots can get at them. They are, especially the nitrate of soda, ready to be taken up by plants, and are therefore quick-acting forms of ammonia. It is mainly the ammonia from nitrate of soda and sulphate of ammonia that will be designated under the heading of water-soluble ammonia.

*Organic Ammonia.*—The ammonia in cotton-seed meal, dried blood, tankage, fish scrap, and so on, is included under this heading. These materials are insoluble in water, and before they can feed plants they must decay and have their ammonia changed, by the aid of the bacteria of the soil, to nitrates, similar to nitrate of soda.

They are valuable then as plant food in proportion to their content of ammonia, and the rapidity with which they decay in the soil, or rather the rate of decay, will determine the quickness of their action as fertilizers. With short season, quick-growing crops, quickness of action is an important consideration, but with crops occupying the land during the greater portion, or all, of the growing season, it is better to have a fertilizer that will become available more slowly, so as to feed the plant till maturity. Cotton-seed meal and dried blood decompose fairly rapidly, but will last the greater portion, if not all, of the growing season in this State. While cotton seed and tankage will last longer than meal and blood, none of these act so quickly, or give out so soon, as nitrate of soda and sulphate of ammonia.

*Total Ammonia* is made up of the water-soluble and organic; it is the sum of these two.

The farmer should suit, as far as possible, the kind of ammonia to his different crops, and a study of the forms of ammonia as given in the tables of analyses will help him to do this.

#### AVAILABILITY OF NITROGEN.

During the past few years the increasing cost and the extensive use for other purposes of the standard high grade ammoniates have caused the appearance upon the market of many new nitrogenous materials which are being used as sources of nitrogen in commercial fertilizers. These materials are, to a large extent, trade-waste products in themselves not permissible as sources of nitrogen, but which after treatment in various ways develop a considerable degree of availability, and in many cases the nitrogen contained therein becomes very largely water-soluble.

On account of the extensive use of these new ammoniates this department is now making in its laboratory by chemical methods determinations of the availability of the water-insoluble organic nitrogen in the samples of fertilizers taken for analysis. In this way we are largely able

to differentiate between the good and bad ammoniates and to distinguish those forms which are readily available from those more difficultly so.

#### FORM OF POTASH IN TOBACCO FERTILIZERS.

Tobacco growers are becoming yearly more disposed to know the form of potash, whether from kainit, muriate, or sulphate, which enters into their tobacco fertilizers. Considerable work of this kind has been done for individuals, and we now determine the form of potash in all tobacco brands, for the benefit of tobacco growers.

The term potash from muriate, as reported in the analyses, does not mean, necessarily, that the potash was supplied by muriate of potash. Sulphate or some other potash salt may have been used, but in all fertilizers where the term potash from muriate is used, there is enough chlorine present to combine with all the potash, though it may have come from salt in tankage, kainit, or karnalite. As the objection to the use of muriate of potash in tobacco fertilizers arises from the chlorine present, it does not matter whether this substance is present in common salt or potash-furnishing materials.

The use of sulphate of potash where there is chlorine present in the other ingredients of the fertilizer will not prevent the injurious effect of the chlorine. The term potash from muriate in our analyses, therefore, means that there is sufficient chlorine present in the fertilizer from all sources to combine with the potash to the extent indicated by the analyses.

#### VALUATIONS.

To have a basis for comparing the values of different fertilizer materials and fertilizers, it is necessary to assign prices to the three valuable constituents of fertilizers—ammonia, phosphoric acid, and potash. These figures, expressing relative value per ton, are not intended to represent crop-producing power, or agricultural value, but are estimates of the commercial value of ammonia, phosphoric acid and potash in the materials supplying them. These values are only approximate, as the cost of fertilizing materials is liable to change, as other commercial products are, but they are believed to fairly represent the cost of making and putting fertilizers on the market. They are based on a careful examination of trade conditions, wholesale and retail, and upon quotations of manufacture.

*Relative value per ton*, or the figures showing this, represents the prices on board the cars at the factory, in retail lots of five tons or less, for cash.

To make a complete fertilizer the factories have to mix together in proper proportions materials containing ammonia, phosphoric acid, and potash. This costs something. For this reason it is thought well to have two sets of valuations—one for the raw or unmixed materials, such as acid phosphate, kainit, cotton-seed meal, etc., and one for mixed fertilizers.

The values used last season were:

#### VALUATIONS FOR 1914

##### *In Unmixed or Raw Materials*

For phosphoric acid in acid phosphate.....	4	cents per pound
For phosphoric acid in bone meal and Peruvian Guano and basic slag .....	4	cents per pound
For nitrogen .....	19½	cents per pound
For potash .....	4	cents per pound

##### *In Mixed Fertilizers*

For phosphoric acid .....	4½	cents per pound
For nitrogen .....	21	cents per pound
For potash .....	5	cents per pound

#### VALUATIONS FOR 1915

##### *In Unmixed or Raw Materials*

For phosphoric acid in acid phosphate.....	4	cents per pound
For phosphoric acid in bone meal and Peruvian Guano	3½	cents per pound
For nitrogen .....	19	cents per pound
For potash .....	8	cents per pound

##### *In Mixed Fertilizers*

For phosphoric acid .....	4½	cents per pound
For nitrogen .....	20	cents per pound
For potash .....	8½	cents per pound

#### HOW RELATIVE VALUE IS CALCULATED.

In the calculation of relative value it is only necessary to remember that so many per cent means the same number of pounds per hundred, and that there are twenty hundred pounds in one ton (2,000 pounds).

With an 8-2-1.65 goods, which means that the fertilizer contains available phosphoric acid 8 per cent, potash 2 per cent, and nitrogen 1.65 per cent, the calculation is made as follows:

<i>Percentage or Lbs. in 100 Lbs.</i>	<i>Value per 100 Lbs.</i>	<i>Value per Ton. 2,000 Lbs.</i>
8 pounds available phosphoric acid at 4½ cents...	$0.36 \times 20$	\$7.20
2 pounds potash at 8½ cents.....	$0.17 \times 20$	3.40
1.65 pounds nitrogen at 20 cents.....	$0.33 \times 20$	6.60
Total value .....	$0.86 \times 20$	\$17.20

Freight and merchant's commission must be added to these prices.

# ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1914. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash	
Brands claiming										
5105	Atlantic Chemical Co., Norfolk, Va.	Atlantic Special Guano.	Clyde.	8.00			.82	1.00	2.00	\$ 12.64
4933	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Standard.	Siler City.	9.69	.50	.38	.88	1.07	1.98	14.40
5033	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addisons' Little Giant Wheat and grass Grower.	Burlington.	8.26	1.30	.38	1.68	2.04	2.06	16.55
Brands claiming										
5061	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Guano S-1-3.	Gilkey.	8.98	.96	.52	1.48	1.80	3.18	17.48
4900	General Mfg. Co., Norfolk, Va.	9-1-3 Guano.	Salisbury.	8.00			.82	1.00	3.00	13.64
4902	Va.-Car. Chemical Co., Richmond, Va.	V. C. Co.'s Pinnacle Grain Grower.	Troy.	8.79	.50	.40	.90	1.09	3.00	16.69
Brands claiming										
5116	Baugh & Sons Co., Norfolk, Va.	Baugh's Southern States Excelsior Guano	Guilford College.	9.99	1.16	.38	1.54	1.87	2.28	17.74
5119	Pocahontas Guano Co., Lynchburg, Va.	A. A. Complete Champion Brand.	Colfax.	7.84	.72	.36	1.08	1.31	2.48	14.07
Brands claiming										
5020	American Agricultural Chemical Co., New York, N. Y.	Canton Chemical Co.'s Game Guano.	Cid.	8.00			1.00	1.22	3.00	14.40
5046	do.	Detricks's Fish Mixture.	Conover.	8.06	.46	.48	.94	1.14	2.98	14.18
5034	do.	Lazaretto Crop Grower.	Shelby.	9.54	.71	.20	.94	1.14	2.94	15.47
4932	do.	Standard Bradley's Guano.	Siler City.	8.00			1.65	2.00	2.00	16.13
5009	do.	Zell's Fish Guano.	Statesville.	8.48	1.72	.44	2.16	2.63	2.06	18.76
5019	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano.	Cid.	8.20	1.26	.30	1.56	1.89	2.02	15.95
				8.57	.62	.24	.86	1.05	2.82	14.14
				9.60	1.48	.48	1.96	2.38	1.56	18.43
				8.30	1.50	.30	1.80	2.19	2.06	17.09
				9.65	.96	.46	1.42	1.73	1.78	16.43

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1914.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash	
4996	Armour Fertilizer Co., Greensboro, N. C.	Armour's Slaughter House Fertilizer	Gastonia	7.46	1.00	.38	1.38	1.68	1.88	\$ 14.39
5068	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Combat Fertilizer	Asheville	6.25	.62	1.06	1.68	2.04	2.60	15.28
5107	Atlantic Chemical Co., Norfolk, Va.	Atlantic Special Wheat Fertilizer	Clyde	7.92	1.08	.54	1.62	1.97	2.10	16.03
4923	Baugh & Sons Co., Philadelphia, Pa.	Baugh's Animal Base and Potash Compound	Winston-Salem	8.05	1.04	.72	1.76	2.14	2.12	16.76
5086	Bowker Fertilizer Co., Boston, Mass.	Bowker Empire Standard Guano	Morganton	8.36	1.18	.24	1.42	7.31	1.80	15.29
5076	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's S-2-2 Guano	Concord	7.85	.90	.66	1.56	1.89	1.80	15.42
5021	Caraleigh Phosphate & Fertilizer Works, Raleigh, N. C.	Eli Ammoniated Guano	Cid	9.26	.70	1.00	1.70	2.07	2.26	17.73
4937	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 2-8-2	Stony Point	8.25	1.09	.70	1.70	2.07	2.18	16.74
5129	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano	Henderson	8.04	1.04	.58	1.62	1.97	1.98	16.02
5077	General Manufacturing Co., Norfolk, Va.	Big Crop Grower	Salisbury	8.50	.98	.70	1.68	2.04	1.96	16.67
4881	Georgia Chemical Works, Augusta, Ga.	Georgia Formula	Elkin	6.65	1.20	.38	1.58	1.92	1.84	16.46
4939	Imperial Co., Norfolk, Va.	Champion Guano	Statesville	8.28	1.40	.30	1.70	2.07	2.04	16.63
4940	Marietta Fertilizer Co., Greensboro, N. C.	Marietta Solid South Guano	Hilldenite	7.55	1.36	.34	1.70	2.07	2.04	15.97
4892	Miller Fertilizer Co., Baltimore, Md.	Dissolved Bone	Lexington	7.95	1.02	.62	1.64	1.99	2.02	16.66
4948	Navassa Guano Co., Wilmington N. C.	Navassa Grain Fertilizer	Maiden	7.95	1.00	.56	1.56	1.89	1.96	15.67
5047	Palmetto Guano Co., Columbia, S. C.	Palmetto Special Fertilizer	Lincolnton	7.61	1.06	.48	1.54	1.87	1.94	15.26
5012	Patapsco Guano Co., Baltimore, Md.	Sea Gull Ammoniated Guano	Statesville	8.48	1.80	.28	2.08	2.53	2.06	18.43
6122	Powhatan Chemical Co., Richmond, Va.	Magic Tobacco Grower	Mt. Airy	8.08	-----	-----	1.74	2.11	1.98	16.56



5013	Resin Monumental Co., Baltimore, Md.	Empire Guano	Mooreville	9.15	1.04	.48	1.52	1.85	1.70	16.32
4979	Reidsville Fertilizer Co., Reidsville, N. C.	Banner Fertilizer	King	7.87	1.26	.40	1.66	2.02	2.20	16.25
4915	Richmond Guano Co., Richmond, Va.	Premium Brand Fertilizer	Shelby	8.01	.98	.86	1.84	2.24	2.00	16.94
5032	Robertson Fertilizer Co., Norfolk, Va.	Double Dollar Soluble Guano	Gibsonville	7.56	1.12	.62	1.74	2.11	2.20	16.31
4997	Royster, F. S., Guano Co., Norfolk, Va.	Farmers Bone Fertilizer	Lincolnton	8.05	1.01	.60	1.64	1.99	2.12	16.25
5000	do.	Rouster's Special Wheat Fertilizer	Kings Mountain	8.02	1.28	.66	1.94	2.36	2.22	17.59
5088	Southern Cotton Oil Co., Shelby, N. C.	Double Two	Shelby	6.99	.78	.74	1.52	1.85	2.32	14.99
5015	Swift Fertilizer Works, Atlanta, Ga.	Swifts' Red Steer Standard Grade Guano	Statesville	7.55	.56	.90	1.46	1.78	2.31	15.27
5090	Tennessee Chemical Co., Greensboro, N. C.	Ox Fertilizer	Concord	7.98	.98	.56	1.54	1.87	1.94	15.59
5043	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Standard	Faith	7.51	1.24	.32	1.54	1.87	1.92	15.15
5079	Union Guano Co., Winston-Salem, N. C.	Fish Brand Ammoniated Guano	High Point	10.09	.84	.66	1.50	1.82	1.98	17.36
4917	do.	do.	Waco	7.90	1.00	.64	1.64	1.99	1.92	15.92
4981	do.	Old Honesty Guano	King	8.44	.98	.64	1.62	1.97	2.05	16.48
5049	Venable Fertilizer Co., Richmond, Va.	Planters Bone Fertilizer	Claremont	8.05	1.00	.74	1.74	2.11	2.10	16.65
4959	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer	Mooreville	8.00	1.16	.46	1.62	1.97	1.64	15.64
5104	do.	Allison & Addison's Old Hickory Guano	Whiteville	6.15	1.36	.56	1.92	2.33	2.18	15.78
4924	do.	Davie & Whittle's Owl Brand Guano	Southmont	8.53	.98	.98	1.66	2.02	2.02	16.67
4918	do.	Durham Fert. Co.'s Genuine Bone and Peruvian Guano	Lincolnton	7.83	.84	.66	1.54	1.87	1.98	15.49
4919	do.	Owl Brand Guano	Lawndale	8.07	1.18	.46	1.64	1.99	2.02	16.17
5100	do.	Tinsley, J. G., & Co.'s Stonewall Guano	Raleigh	8.52	1.04	.54	1.58	1.92	1.58	15.88
4883	do.	Travers, S. W., & Co., Beef, Blood & Bone Fertilizer	N. Wilkesboro	9.01	1.00	.58	1.58	1.92	2.05	16.85
5022	do.	Travers, S. W., & Co., National Fertilizer	Thomasville	9.06	1.20	.50	1.70	2.07	2.22	17.51
4973	do.	V. C. C. Co's Farmers Favorite Fertilizer	Tabor	8.40	1.38	.74	2.12	2.58	2.02	18.48
<b>Brand claiming</b>				8.00	-----	-----	1.65	2.00	3.00	17.13
5059	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union Guano	Gilkey	9.41	2.36	.44	2.80	3.40	1.84	22.07



4901	General Manufacturing Co., Norfolk, Va. ....	Tobacco Special.....	Salisbury.....	8.84	1.90	.34	2.24	2.77	2.28	19.64
5102	Navassa Guano Co., Wilmington, N. C.....	Navassa Standard Meal Guano.....	Chadbourn.....	8.89	1.58	.64	2.22	2.70	2.70	20.02
5097	N. C. Cotton Oil Co., Wilmington, N. C.....	Wilmington High Grade.....	Wallace.....	7.20	1.10	1.46	2.56	3.11	3.86	21.09
5110	Patapsco Guano Co., Baltimore, Md.....	Choctaw Guano.....	Statesville.....	8.33	1.82	.34	2.16	2.63	3.00	19.57
5136	Pocomoke Guano Co., Norfolk, Va.....	Monarch Tobacco Guano.....	Statesville.....	8.25	1.56	.52	2.08	2.53	2.72	18.88
5001	Richmond Guano Co., Richmond, Va.....	Gilt Edge Fertilizer.....	Kings Mountain.....	8.75	1.16	.94	2.10	2.55	3.34	20.03
4998	Royster, F. S., Guano Co., Norfolk, Va.....	Marlboro High Grade F. S. R.....	Lincolnton.....	8.02	1.74	.72	2.46	2.99	3.08	20.63
5121	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Ruralist High Grade Guano.....	High Point.....	7.09	.66	1.22	1.88	2.29	2.74	17.02
5016	Union Guano Co., Winston-Salem, N. C.....	Union Homestead Guano.....	Statesville.....	7.20	1.70	.36	2.38	2.89	4.36	20.84
4949	Va.-Car. Chemical Co., Richmond, Va.....	Allison & Addison's A. A. Guano.....	Charlotte.....	7.78	2.50	.46	2.96	3.60	3.26	22.69
5064	do.....	Durham Fertilizer Co's. Gold Medal Brand Guano.	Lattimore.....	9.69	1.56	.46	2.02	2.46	2.82	20.02
4971	do.....	Norfolk & Carolina Chemical Co's. High Grade Manure.	Vanceboro.....	8.58	2.12	.44	2.56	3.11	3.08	21.55
4974	do.....	V. C. C. Co's. Menhaden Fish and Meal Mixture.	Tabor.....	8.69	1.88	1.00	2.88	3.50	3.58	23.50
5098	do.....	V.-Car. Chemical Co's Royal High Grade Fertilizer.	Raleigh.....	8.48	1.24	.56	1.80	2.19	2.58	17.77
4975	Brand claiming	Armour's No. 836 Fertilizer.	Mount Airy.....	8.00	-----	-----	2.47	3.00	6.00	23.57
5103	Brands claiming	Navassa High Grade Fertilizer.	Chadbourn.....	8.75	2.88	.44	3.24	3.94	4.08	25.56
4969	do.....	Wilmington Truck Grower.....	Chadbourn.....	8.06	.68	2.50	3.18	3.87	4.48	25.09
6113	Brand claiming	Special Mixture.	Salisbury.....	8.00	-----	-----	3.29	4.00	5.00	26.02
5031	Brands claiming	American Bone Mixture.	Reidsville.....	9.40	-----	-----	3.53	4.29	1.16	24.45
5128	do.....	Armours' No. 9-1-2 Fertilizer.	Snow Hill.....	9.00	-----	-----	.82	1.00	2.00	13.54
4891	Bangh & Sons, Co., Philadelphia, Pa.....	Bangh's Grain and Grass Grower.....	Lexington.....	8.92	.54	.20	.74	.90	2.26	13.40
5118	Pocahontas Guano Co., Lynchburg, Va.....	Planters Special.....	Colfax.....	8.78	.38	.48	.86	1.05	2.00	13.51
				9.45	.90	.44	1.34	1.63	2.00	16.13
				7.80	.70	.18	.88	1.07	2.02	12.73

## ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1914.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
5002	Richmond Guano Co., Richmond, Va.	Premium Wheat Grower	Kings Mountain	9.34	.16	.80	.96	1.17	\$ 14.74
4977	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 1-2-2 Guano	Rural Hall	9.62	.54	.38	.92	1.12	14.56
<b>Brands claiming</b>				9.00			.82	1.00	14.54
5055	American Agricultural Chemical Co., New York, N. Y.	Detrick's Grain and Grass Compound	Landis	9.30	.54	.22	.76	.92	14.46
5083	do.	Mogul Fertilizer	Shelby	8.86	.50	.20	.70	.85	13.79
5008	do.	Zell's Hustler Phosphate	Davidson	8.93	.54	.24	.78	.95	14.19
5042	Armour Fertilizer Works, Greensboro, N. C.	Armour's No. 913 Fertilizer	China Grove	8.86	.30	.54	.84	1.02	14.38
5106	Atlantic Chemical Co., Norfolk Va.	Atlantic Grain Guano	Clyde	8.65	.32	.50	.82	1.00	14.15
4914	Baugh & Sons Co., Philadelphia, Pa.	Baugh's Peninsula Grain Producer	Waco	9.34	.42	.40	.82	1.00	14.19
4899	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's 9-1-3 Guano	Richfield	9.29	.56	.36	.92	1.12	15.26
5034	Carolina Union Guano Co., Winston-Salem, N. C.	R. S. Ammoniated Guano	Gibsonville	10.02	.69	.38	.98	1.19	15.59
5094	Columbia Guano Co., Norfolk, Va.	Columbia Grain Grower	Marion	9.11	.18	.63	.86	1.05	14.47
5117	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union 9-1-3 Standard Grade Guano	Asheboro	7.86	.11	.95	1.12	1.36	14.90
4976	Navassa Guano Co., Wilmington, N. C.	Long's Wheat and Grass Guano	Walnut Cove	9.46	.46	.38	.84	1.02	15.02
5120	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Grain Fertilizer	Winston-Salem	8.93	.64	.28	.92	1.12	14.46
5011	Patapsco Guano Co., Baltimore Md.	Coon Brand Guano	Statesville	8.95	.88	.22	1.10	1.34	15.99
5062	Rasin Monumental Co., Baltimore, Md.	Rasin I. X. L. Fertilizer	Ellenboro	8.89			.82	1.00	15.30

5063	Robertson Fertilizer Co., Norfolk, Va.....	Robertson's 1-9-3 Guano.....	Ellenboro.....	8.76	.58	.38	.96	1.17	3.14	15.06
4999	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's Grain Guano.....	Kings Mountain.....	9.13	.46	.46	.92	1.17	3.05	15.16
4916	Southern Cotton Oil Co., Shelby, N. C.....	Special Grain Grower.....	Cherryville.....	8.98	.64	.54	1.18	1.43	2.62	15.66
5070	Swift's Fertilizer Works, Atlanta, Ga.....	Swift's Special High Grade Guano.....	Hendersonville.....	8.63	.42	.64	10.6	1.29	3.12	15.34
5127	Tuscarora Fertilizer Co., Greensboro, N. C.....	Tuscarora Fertilizer Co.'s 9-3-1.....	Hendersonville.....	8.70	.28	.48	.76	.92	2.62	13.84
4957	Union Guano Co., Winston-Salem, N. C.....	B. S. Ammoniated Guano.....	Cornelius.....	9.35	.96	.36	1.32	1.61	3.02	16.98
5050	Venable Fertilizer Co., Richmond, Va.....	Majestic Grain Guano.....	Claremont.....	8.80	.12	.72	.76	.92	3.44	14.55
6121	Va-Car. Chemical Co., Richmond, Va.....	Bigelow's Crop Guano.....	Mount Airy.....	9.72	-----	-----	.78	.95	3.34	15.36
4920	-----do-----	-----do-----	Lawndale.....	8.76	.56	.36	.92	1.12	3.52	15.27
4946	-----do-----	V. C. C. Co's McCormick's Wheat and Grain Guano.....	Waynesville.....	8.27	.56	.36	.92	1.12	2.84	14.15
4978	<b>Brand claiming</b>	-----do-----	-----do-----	9.00	-----	-----	1.00	1.22	2.00	14.30
	Robertson Fertilizer Co., Norfolk, Va.....	Robertson's Blood and Bone Mixture.....	Mount Airy.....	9.08	.80	.38	1.18	1.43	2.08	15.21
	<b>Brand claiming</b>	-----do-----	-----do-----	9.00	-----	-----	1.00	1.22	3.00	15.30
5056	Tidewater Guano Co., Norfolk, Va.....	Tidewater 9-3-1.....	Concord.....	8.60	.66	.40	1.06	1.29	3.03	15.27
4908	<b>Brand claiming</b>	-----do-----	-----do-----	9.00	-----	-----	1.65	2.00	1.00	16.03
	Va-Car. Chemical Co., Richmond, Va.....	Allison & Addison's Star Brand Guano.....	Waynesville.....	9.08	1.18	.34	1.52	1.85	1.18	15.74
	<b>Brands claiming</b>	-----do-----	-----do-----	9.00	-----	-----	1.65	2.00	3.00	18.03
5130	Georgia Chemical Works, Augusta, Ga.....	Good as Gold Guano.....	Saw Mills.....	8.83	1.28	.40	1.68	2.04	2.78	17.78
5089	Southern Cotton Oil Co., Shelby, N. C.....	Razem.....	Shelby.....	8.05	.92	1.10	2.02	2.46	2.94	18.57
4958	Union Guano Co., Winston-Salem, N. C.....	Farmers Blood and Bone Guano.....	Cornelius.....	8.75	1.26	.38	1.64	1.99	2.90	17.66
	<b>Brand claiming</b>	-----do-----	-----do-----	9.00	-----	-----	2.47	3.00	3.00	21.47
4991	Navassa Guano Co., Wilmington, N. C.....	Navassa High Grade Guano.....	Graham.....	9.40	1.10	.34	1.44	1.75	2.32	16.83
	<b>Brands claiming</b>	-----do-----	-----do-----	10.00	-----	-----	1.65	2.00	2.00	17.93
5126	Asheville Packing Co., Asheville, N. C.....	Asheville Packing Co.'s Fertilizer.....	Asheville.....	8.37	.52	1.62	2.14	2.00	2.16	18.68
5060	Cooperative Warehouse Co., Salisbury, N. C.....	Farmer's Union Guano.....	Gilkey.....	8.29	.84	.68	1.52	1.85	2.04	15.88
5048	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Eagle Standard Grade Guano.....	Conover.....	10.12	.02	1.84	1.86	2.26	1.58	18.50



4885	Georgia Chemical Works, Augusta, Ga.....	Bone and Potash.....	N. Wilkesboro.....	10.55	-----	2.18	-----	11.67
5081	Imperial Guano Co., Norfolk, Va.....	Virginia Grain Mixture.....	Star.....	9.90	-----	1.90	-----	10.81
4992	-----do.....	Bone and Potash.....	Mebane.....	9.94	-----	1.86	-----	10.81
4942	Lister's Agricultural Chemical Co., New York, N. Y.....	Lister's Dissolved Bone and Potash.....	Stony Point.....	9.71	-----	2.34	-----	11.08
4941	Marietta Fertilizer Co., Greensboro, N. C.....	Marietta Dissolved Bone and Potash.....	Hildenite.....	9.59	-----	1.82	-----	10.45
4984	Miller Fertilizer Co., Baltimore, Md.....	Clinch Phosphate.....	Mount Airy.....	9.89	-----	1.98	-----	10.88
4964	Navassa Guano Co., Wilmington, N. C.....	Navassa Dissolved Bone with Potash.....	Mooresville.....	10.28	-----	1.70	-----	10.95
5139	-----do.....	Navassa Piedmont Wheat Grover.....	Lincolnton.....	9.49	-----	2.54	-----	11.03
4884	Norfolk Fertilizer Co., Norfolk, Va.....	Oriana Bone and Potash.....	Hoosier Siding.....	10.65	-----	2.06	-----	11.64
4904	Old Buck Guano Co., Richmond, Va.....	Old Buck Hartford Bone and Potash.....	Norwood.....	10.25	-----	2.02	-----	11.24
4894	Palmetto Guano Co., Columbia S. C.....	Palmetto Bone and Potash Mixture.....	Lexington.....	11.43	-----	1.80	-----	12.09
4935	Patapsco Guano Co., Baltimore, Md.....	Patapsco Soluble Phosphate and Potash.....	Julian.....	11.96	-----	1.16	-----	11.92
5091	Powhatan Chemical Co., Richmond, Va.....	Bone and Potash Mixture.....	Concord.....	10.61	-----	1.80	-----	11.35
4951	Rasin Monumental Co., Baltimore, Md.....	Bone and Potash.....	Cornelius.....	10.88	-----	2.12	-----	11.91
5125	Reidsville Fertilizer Co., Reidsville, N. C.....	-----do.....	Asheboro.....	10.18	-----	2.62	-----	11.78
5003	Richmond Guano Co., Richmond, Va.....	Bone and Potash Mixture.....	King's Mountain.....	10.10	-----	2.28	-----	11.37
5035	Robertson Fertilizer Co., Norfolk, Va.....	Level Run Dissolved Bone and Potash.....	Gibsonville.....	9.67	-----	1.76	-----	10.46
5004	Royster, F. S., Guano Co., Norfolk, Va.....	Royster's 10-2 Bone and Potash Mixture.....	Lincolnton.....	10.38	-----	2.02	-----	11.36
5051	Southern Cotton Oil Co., Charlotte, N. C.....	Magnolia B. P. Standard Bone and Potash	Catawba.....	10.89	-----	1.34	-----	11.14
4983	Swift Fertilizer Works, Atlanta, Ga.....	Farmers Union Bone and Potash.....	King.....	8.96	-----	1.94	-----	10.00
4910	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Field and Farm Standard Grade Phosphate and Potash.....	Bryson City.....	10.24	-----	1.76	-----	10.98
4945	Tennessee Chemical Co., Greensboro, N. C.....	Ox Potash.....	Taylorsville.....	9.66	-----	1.68	-----	10.37
6119	Tidewater Guano Co., Norfolk, Va.....	Bully Boy Dissolved Bone and Potash.....	Concord.....	9.93	-----	1.84	-----	10.80
4909	Tuscarora Fertilizer Co., Greensboro, N. C.....	Tuscarora Golden Grain Grover.....	Craggy.....	9.33	-----	1.90	-----	10.30
5023	-----do.....	Tuscarora Bone and Potash.....	Cid.....	9.65	-----	1.92	-----	10.60
4963	Union Guano Co., Winston-Salem, N. C.....	Union Bone and Potash.....	Cornelius.....	10.47	-----	1.92	-----	11.34

## ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1914.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	
4962	Va-Car. Chemical Co., Richmond, Va.	Allison & Addison's B. & P. Potash Mixture.	Mooreville	19.26				1.52	\$ 10.75
4982	do.	Allison & Addison's McGavock's Special Potash Mixture.	Mount Airy	11.01				2.26	12.02
4925	do.	Davie & Whittle's Owl Brand Acid Phosphate with Potash.	South Mount	11.58				2.16	12.58
4911	do.	Durham Fertilizer Co.'s Blue Ridge Wheat Grower	Waynesville	19.21				1.64	10.83
4893	do.	Durham Fertilizer Co.'s Bone and Potash Mixture.	Mocksville	11.37				2.22	12.45
4961	do.	Old Dominion Alkaline Bone and Potash.	Bostic	19.87				2.00	11.78
4936	do.	Southern Chemical Co.'s Mammoth Wheat and Grass Grower.	Siler City	11.92				1.72	12.45
4994	do.	J. G. Tinsley & Co.'s Bone and Potash Mixture.	Graham	9.65				1.84	10.52
5112	do.	S. W. Travers & Co.'s Capital Acid Phosphate Compound.	Honny	11.27				2.32	12.46
4960	do.	S. W. Traver's Capital Bone and Potash Compound.	Rutherfordton	10.58				1.78	11.30
<b>Brands claiming</b>									
6115	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's 10-4 Bone and Potash.	Richfield	11.02				3.10	13.02
5017	do.	do.	Statesville	10.48				3.38	12.99
6116	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 10-4.	Richfield	10.22				3.76	12.96
6118	Cooperative Warehouse Co., Salisbury, N. C.	Farmers Union 10-4.	Concord	12.28				2.30	13.35
5080	General Manufacturing Co., Norfolk, Va.	Potash and Soluble Bone.	Salisbury	11.36				2.80	13.02
4905	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone with Potash.	Richfield	8.69				3.98	11.80
4926	Swift Fertilizer Works, Atlanta, Ga.	Swift's Farmers Home High Grade Phosphate and Potash.	Richfield	10.31				2.36	11.64



5057	Tidewater Guano Co., Norfolk, Va.....	Dianah Brand Bone and Potash Com- pound.....	Concord.....	10.11	3.74	12.84
	<b>Brand claiming</b> .....			10.00	6.00	15.00
6114	General Manufacturing Co., Norfolk, Va. ....	Potash and Soluble Bone.....	Salisbury.....	11.06	4.30	14.25
	<b>Brands claiming</b> .....			12.00	2.00	12.80
5065	Armour Fertilizer Works, Greensboro, N. C....	Armour's Phosphate Potash Fertilizer.....	Rutherfordton.....	10.05	1.80	10.84
5123	Cooperative Warehouse Co., Salisbury, N. C....	Farmers Union 12-2 Bone and Potash.....	Asheboro.....	10.87	2.28	12.06
5109	Farmers Guano Works, Dillard, Ga.....	Special for Wheat.....	Franklin.....	12.40	2.00	13.16
5141	Georgia Chemical Works, Augusta, Ga.....	Georgia 12-2 Bone and Potash.....	Morganton.....	13.80	1.14	13.56
5143	Old Buck Guano Co., Richmond, Va.....	Old Buck High Grade Phosphate and Pot- ash.....	Morganton.....	11.75	1.62	12.19
5124	Rasin Monumental Co., Baltimore, Md.....	Rasin's Bone and Potash.....	Asheboro.....	12.10	1.96	12.85
5072	Swift Fertilizer Works, Atlanta, Ga.....	Swift's Atlantic High Grade Phosphoric Acid.....	Hendersonville.....	12.83	1.32	12.87
5140	Tennessee Chemical Co., Greensboro, N. C....	Alkaline Bone.....	Dallas.....	12.01	1.94	12.75
5092	Tidewater Guano Co., Norfolk, Va.....	Tidewater 12-2 Bone and Potash.....	Concord.....	12.26	1.82	12.85
5052	Union Guano Co., Winston-Salem, N. C.....	Union 12-2 Bone and Potash.....	Conover.....	13.36	1.64	13.66
4912	Va.-Car. Chemical Co., Richmond, Va.....	Buyers Mixture.....	Waynesville.....	11.55	2.22	12.61
5096	.....do.....	V.-C. C. Co.'s Special Mixture.....	Iron Station.....	11.69	1.92	12.14
	<b>Brand claiming</b> .....			12.00	4.00	13.60
5122	Cooperative Warehouse Co., Salisbury, N. C....	Farmers Union 12-4 Bone and Potash .....	Winston-Salem.....	12.24	2.76	13.78
	<b>Brands claiming</b> .....			14.00	2.00	13.20
4943	Carolina Union Guano Co., Norfolk, Va.....	Carolina Union 14-2.....	Stony Point.....	15.00	1.84	15.34
5144	Roberston Fertilizer Co., Norfolk, Va.....	Robertson's 14-2.....	Shelby.....	14.00	2.03	14.63
5093	Tidewater Guano Co., Norfolk, Va.....	Tidewater 14-2.....	Concord.....	14.54	1.84	14.93
	<b>Brands claiming</b> .....			15.00	2.00	15.50
5108	Armour Fertilizer Works, Atlanta, Ga.....	Armour's Phosphate and Potash.....	Franklin.....	14.75	1.88	15.15
5111	Royster, F. S., Guano Co., Norfolk, Va.....	Royster Guano Co.'s Bone and Potash Mixture.....	Franklin.....	14.86	2.00	15.37
	<b>Brand claiming.</b> .....			13.00	2.05	20.35
4927	Baugh & Sons, Norfolk, Va.....	Baugh's Pure Dissolved Animal Bone.....	Winston-Salem.....	16.69	2.26	24.51



4929	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand High Grade Dissolved Bone.	South Mont.	15.22	12.18
	<b>Brand claiming</b>			15.00	12.00
5073	Swift Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Hendersonville.	15.08	12.06
	<b>Brands claiming</b>			16.00	12.80
4895	Aeme Manufacturing Co., Wilmington, N. C.	16% Acid Phosphate.	Lexington.	17.27	13.82
5053	American Agricultural Chemical Co., New York, N. Y.	Lazaretto 16% Acid Phosphate.	Hickory.	16.81	13.45
4965	do.	Zell's 16% Acid Phosphate.	Mooresville.	15.83	12.66
4953	American Fertilizer Works, Norfolk, Va.	American High Grade Acid Phosphate.	Charlotte.	17.08	13.66
6117	Armour Fertilizer Works, Greensboro, N. C.	Armour's 16% Acid Phosphate.	Gastonia.	16.49	13.19
5006	do.	do.	Gastonia.	15.53	12.42
4913	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co's 16% Acid Phosphate.		16.27	13.02
5134	Atlantic Chemical Co., Norfolk, Va.	Atlantic High Grade 16% Acid Phosphate.	Hickory.	16.92	13.51
4990	Baugh & Sons Co., Norfolk, Va.	Baugh's 16% Acid Phosphate.	Craggy.	16.27	13.02
5115	Beta Fertilizer Works, Beta, N. C.	Beta Special Acid Phosphate 16%.	Beta.	15.81	12.65
5038	Bryant Fertilizer Co., Alexandria, Va.	Bryant's 16% Acid Phosphate.	Burlington.	16.22	12.95
5039	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 16%.	Liberty.	16.72	13.38
5133	Columbia Guano Co., Norfolk, Va.	Columbia High Grade 16% Acid Phosphate.	Granite Falls.	16.65	13.32
4906	Cooperative Warehouse Co., Salisbury, N. C.	Furners Union 16% Acid Phosphate.	Salisbury.	16.09	12.87
4887	Georgia Chemical Works, Augusta, Ga.	High Grade Dissolved Bone Phosphate.	N. Wilkesboro.	16.13	13.09
4954	Imperial Co., Norfolk, Va.	High Grade Tennessee Acid Phosphate.	Statesville.	16.03	12.82
4966	Navassa Guano Co., Wilmington, N. C.	Navassa 16% Acid Phosphate.	Mooresville.	16.28	13.02
4907	Old Buck Guano Co., Richmond, Va.	Old Buck 16% Acid Phosphate.	Norwood.	16.95	13.56
4896	Palmetto Guano Co., Columbia, S. C.	Palmetto Acid Phosphate.	Lexington.	16.07	12.86
4965	Patapasco Guano Co., Baltimore, Md.	Florida Soluble Phosphate.	Roxboro.	16.89	13.51
4956	Pocomoke Guano Co., Norfolk, Va.	Superb Acid Phosphate 16%.	Maiden.	16.88	13.50
5027	Resin Monumental Co., Baltimore, Md.	Resin's 16% Acid Phosphate.	Denton.	16.87	13.50

ANALYSES OF COMMERCIAL FERTILIZERS—FALL SEASON, 1914.  
RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Water-soluble Phosphate	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	
5007	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate.	Kings Mountain.	15.98					\$ 12.78
6111	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade 16% Acid Phosphate.	Lincolnton.	16.32					13.06
4921	Southern Cotton Oil Co., Shelby, N. C.	S. C. O. Co.'s Acid.	Cherryville.	16.48					13.18
4928	Swift Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate.	Richfield.	16.55					13.24
5058	Tidewater Guano Co., Norfolk, Va.	Top Rail Acid Phosphate.	Concord.	16.70					13.36
4985	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Acid Phosphate.	Ararat.	16.16					12.93
4989	Union Guano Co., Winston-Salem, N. C.	Union 16% Acid Phosphate.	Marshall.	17.31					13.85
4947	Va.-Car. Chemical Co., Richmond, Va.	Atlantic & Va. Fertilizer Co.'s Eureka Acid Phosphate.	Asheville.	16.50					13.20
4930	do.	Davie & Whittle's Owl Brand High Grade Dissolved Bone.	South Mount.	16.09					12.87
5029	do.	Durham Fertilizer Co.'s Best Acid Phosphate.	Thomasville.	16.78					13.42
5044	do.	Southern Chemical Co.'s Comet Acid Phosphate.	Salisbury.	17.05					13.64
5113	do.	S. W. Travers & Co.'s Champion Acid Phosphate.	Houmby.	16.74					13.39
5005	do.	Va.-Car. Chemical Co.'s 16% Acid Phosphate.	Iron Station.	16.52					13.22
4922	do.	Va. State Fertilizer Co.'s Bull Run Acid Phosphate.	Lincolnton.	17.23					13.78
<b>Brand claiming</b>				<b>24.00</b>					<b>19.20</b>
4890	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Concentrate Acid Phosphate	N. Wilkesboro	24.86					19.91

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## MIXED FERTILIZERS.

Name and Address of Manufacturer			Name of Brand	Where Sampled	Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Muriate	Potash from Sulphate	Chlorine	Relative Value per Ton at Factory
Percentage Composition or Parts per 100														
<b>Brands claiming</b>														
5229	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.			Comet Guano	Walnut Cove	8.00	.78	.68	1.46	1.78	3.16			18.95
6070	Pocomoke Guano Co., Norfolk, Va.			Pocomoke Special	Oakboro	8.03	.74	.34	1.05	1.31	2.72			16.17
<b>Brand claiming</b>														
6002	Cooperative Warehouse Co., Salisbury, N. C.			Farmers Union Guano	Cherryfield	8.33	.18	.60	.78	.95	4.48			18.23
<b>Brand claiming</b>														
5827	Pocahontas Guano Co., Lynchburg, Va.			Carrington's Champion Brand	Colfax	8.05	.70	.22	.92	1.12	2.91			15.90
<b>Brands claiming</b>														
5272	Baugh & Sons Co., Norfolk, Va.			Baugh's Southern States Excelsior Guano	Siloam	7.90	1.12	.56	1.68	2.04	3.46			19.71
5718	Berkley Chemical Co., Norfolk, Va.			Berkley Special	Edenton	7.51	1.26	.52	1.78	2.16	2.78			18.60
5768	Imperial Co., Norfolk, Va.			Imperial Special	Crutchfield	8.85	1.03	.32	1.40	1.70	3.32			19.21
5945	Pocomoke Guano Co., Norfolk, Va.			Pocomoke Special	Belews Creek	7.90	.92	.40	1.32	1.61	2.96			17.42
<b>Brand claiming</b>														
6226	Royster, F. S., Guano Co., Norfolk, Va.			Sambo Peanut Grower	Fayetteville	7.80	.70	.30	1.00	1.22	3.88			17.62
<b>Brand claiming</b>														
5474	Va.-Car. Chemical Co., Richmond, Va.			Allison & Addison's Star Brand Guano	Henderson	9.34	1.62	.26	1.88	2.29	1.60			18.65
<b>Brands claiming</b>														
5191	Acme Mfg. Co., Wilmington, N. C.			Gem Fertilizer	Mount Olive	7.82	1.00	.58	1.58	1.92	1.94			16.66

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Muriate from Potash	Sulphate from Potash	Chlorine			
Brands claiming															
6103	Adair & McCarty Bros., Atlanta, Ga.	Adair's Ammoniated Dissolved Bone	Toecane	8.00				1.85	2.00	2.00					\$17.20
5756	American Agricultural Chemical Co., New York, N. Y.	Bradley's Standard for Tobacco	Siloam	8.12	.72	.72		1.44	1.75	2.06					16.57
5864	do.	Dixie Fertilizer	Eure's Siding	8.02	1.12	.66		1.78	2.16	2.12	.26	1.86	.02		17.94
5819	do.	Eutaw Standard for Tobacco	Townsville	9.61	1.10	.54		1.64	1.99	1.84					18.34
6049	do.	Zell's Calvert Guano	Bennett	8.71	1.14	.46		1.60	1.94	1.80	1.32	.48	1.00		17.30
5329	do.	Zell's Fish Guano	Dallas	8.59	1.30	.42		1.72	2.09	1.78					17.56
6101	do.	do.	Asheville	8.36	1.68	.38		2.06	2.50	2.12					19.37
5450	do.	Zell's Special Compound for Tobacco	Oxford	7.81	1.26	.38		1.64	1.99	2.00					16.99
5257	American Fertilizer Co., Norfolk, Va.	Bone and Peruvian Guano	Wadesboro	7.96	1.52	.40		1.92	2.33	2.06	2.06		7.60		18.35
6124	do.	do.	Cid	8.76	.66	.96		1.62	1.97	1.48					16.88
5534	do.	Hannah's Special Formula	Reidsville	6.36	1.14	.68		1.82	2.21	1.62					15.76
5599	Armour Fertilizer Works, Greensboro, N. C.	Armour's Slaughter House Fertilizer	Marshville	7.96	1.50	.40		1.90	2.31	2.26					18.61
5253	do.	Armour's Slaughter House for Tobacco	Mount Airy	7.78	.88	.66		1.54	1.87	2.22					16.94
5802	do.	do.	Hillsboro	7.90	1.05	.76		1.84	2.24	2.30	.13	2.17	.10		18.38
5687	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Complete Fertilizer	Asheville	8.14	.90	.62		1.52	1.85	1.88	1.32	.56	.10		16.60
5639	Atlantic Chemical Co., Norfolk, Va.	Atlantic Soluble Guano	Canton	5.83	.42	1.01		1.46	1.78	1.46					13.57
5340	Baugh & Sons Co., Norfolk, Va.	Baugh's Animal Base and Potash Compound for all Crops	Grafton	7.81	.96	.62		1.58	1.92	1.92					16.61
				8.02	.92	.78		1.70	2.07	2.18					17.72

5442	---do---	Baugh's Blood and Bone Potash Compound.	Winston-Salem.	7.61	1.14	.68	1.82	2.21	1.98	-----	17.49
5943	---do---	Guilford College	Guilford College	7.79	1.10	.52	1.62	1.97	2.22	-----	17.26
5204	---do---	Baugh's Fish Mixture.	Wadesboro.	7.38	.70	.96	1.66	2.02	2.34	-----	17.26
5850	Berkley Chemical Co., Norfolk, Va.	Branson Superphosphate.	Hemp.	8.38	1.36	.40	1.76	2.14	1.78	-----	17.61
5938	Bowker Fertilizer Co., Boston, Mass.	Bowker's Excelsior Cotton-seed Meal Compound.	Hiddenite.	8.26	1.82	.80	2.62	1.97	2.60	-----	22.33
5600	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Cotton Grower.	Waxhaw.	9.26	1.20	.44	1.64	1.99	2.04	-----	18.36
6254	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's S-2-2.	Fayetteville.	7.74	1.20	.48	1.63	2.04	2.98	-----	18.75
5757	---do---	Farmer's Union Standard Grade Guano.	Kannapolis.	7.90	.98	.80	1.78	2.16	2.28	-----	18.11
5621	---do---	---do---	Hendersonville.	7.23	1.10	.90	2.00	2.43	2.02	-----	16.94
5572	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Butcher Bone.	Youngsville.	7.90	1.20	.46	1.66	2.02	2.66	-----	18.27
5871	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Crown Ammoniated Guano.	Warrenton.	7.85	.76	1.02	1.78	2.16	2.48	-----	18.40
5228	---do---	Eli Ammoniated Guano.	Walnut Cove.	9.50	.92	.98	1.90	2.31	2.34	-----	20.13
6321	Carolina Union Fertilizer Co., Norfolk,	Carolina Union 2-S-2.	Siloam.	8.95	1.80	.32	2.12	2.58	2.58	-----	20.92
5930	---do---	---do---	Mocksville.	7.89	1.06	.54	1.60	1.94	2.10	2.10	5.80
6005	---do---	---do---	Liberty.	7.87	1.18	.46	1.64	1.99	1.70	-----	16.53
5459	Coe-Mortimer Co., Charleston, S. C.	Universal Fertilizer.	Dunn.	8.20	1.52	.38	1.90	2.31	2.06	-----	18.48
6205	---do---	---do---	Duke.	8.02	1.34	.38	1.72	2.09	2.08	-----	17.63
5239	Columbia Guano Co., Norfolk, Va.	Columbia Soluble Guano.	Fremont.	7.90	1.16	.60	1.76	2.14	2.09	-----	17.54
6068	Conestee Chemical Co., Wilmington, N. C.	Cotton-seed Meal Guano.	Norwood.	7.59	.66	1.26	1.92	2.33	1.98	-----	17.88
5644	Cooper Guano Co., Wilmington, N. C.	Cooper's Bald Head Island.	Autryville.	7.95	1.22	.48	1.70	2.07	2.06	-----	17.46
5707	---do---	Cooper's Reward, C. S. M.	Fairmont.	8.68	.48	1.20	1.68	2.04	1.86	-----	17.69
5675	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union Guano.	Louisburg.	8.53	1.18	.50	1.68	2.04	1.98	-----	17.76
5837	Cotton States Fertilizer Works, Wilmington, N. C.	Cotton States Cotton and Corn Fertilizer, Standard Grade.	Statesville.	8.16	.66	.76	1.42	1.73	1.94	-----	16.32
5535	Coweta Fertilizer Co., Newnan, Ga.	Coweta Success Guano.	Reidsville.	7.68	1.56	.40	1.96	2.38	2.78	-----	19.48
5919	Craven Chemical Co., New Bern, N. C.	Elite Cotton Guano.	Richlands.	7.96	.66	.96	1.62	1.97	2.20	-----	17.38

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory	
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash	Muriate from Potash	Sulphate from Potash	Chlorine			
Brands claiming															
6308	Dixie Guano Co., Suffolk, Va.	Dixie Standard Guano.	Bosley.	8.00			1.65	2.00	2.00						\$17.20
5159	Eastern Cotton Oil Co., Hertford, N. C.	Perquimans Favorite.	Hertford	8.16	.63		1.36	1.65	1.98						16.15
5605	Enterprise Guano Co., Baltimore, Md.	Enterprise 2-8-2.	Mource.	7.90	.44	1.18	1.62	1.97	1.84						16.72
5292	Etiwan Fertilizer Co., Charleston, S. C.	Etiwan Ammoniated Fertilizer.	Morven.	8.01	.62	1.14	1.76	2.14	2.04						17.72
5515	Farmers Cotton Oil Co., Wilson, N. C.	Farmers' Special Guano.	Kenly.	8.85	1.20	.60	1.80	2.19	2.00						18.56
6140	Farmers Guano Co., Raleigh, N. C.	Farmers' Ammoniated Guano	Red Springs.	7.75	.34	1.56	1.90	2.31	2.52						19.06
				7.77	.76	1.10	1.86	2.26	2.34						18.41
5645	do.	State Standard Guano.	Roseboro.	7.87	.86	.92	1.78	2.16	2.32						18.15
5408	Farmville Oil and Fertilizer Co., Farmville, N. C.	Davis's Cotton Grower	Farmville.	8.63	.86	1.03	1.94	2.36	2.98						20.59
5981	Fremont Oil Mills Co., Fremont, N. C.	Up-to-date.	Fremont.	7.50	1.46	.16	1.62	1.92	2.16						16.90
5367	General Mfg. Co., Norfolk, Va.	Big Crop Grower.	Spring Hope.	7.96	1.34	.64	1.98	2.41	2.02						18.52
5396	Georgia Chemical Works, Augusta, Ga.	Georgia Formula	Asheboro.	7.26	1.00	.64	1.64	1.99	1.72						16.02
5667	do.	Meal Mixture.	Youngaville.	7.92	.58	1.06	1.64	1.99	2.52						17.97
5695	do.	Special Tobacco.	Rural Hall.	10.44	.62	.40	1.02	1.24	1.50	1.50			.28		16.03
6013	Hampton Guano Co., Norfolk, Va.	Extra Tobacco Guano.	Reidsville.	7.96	1.44	.36	1.74	2.11	2.20	2.20			5.50		17.86
6260	do.	Shirley Superphosphate.	Lillington.	9.60	1.58	.82	2.40	2.92	2.46						22.42
6261	do.	do.	Lillington.	8.28	1.36	.40	1.76	2.14	2.24						18.30
5932	do.	do.	Eller.	7.92	1.50	.36	1.86	2.26	1.68						17.42



6105	Holmes & Dawson, Norfolk, Va.....	Triumph Soluble Guano.....	Williamston.....	7.88	1.26	.36	1.62	1.97	2.04	-----	17.04
5612	Imperial Co., Norfolk, Va.....	Imperial Standard Premium Guano	Dunn.....	8.10	1.36	.34	1.70	2.07	1.70	-----	16.98
5664	Josey, N. B., Guano Co., Tarboro, N. C.	Josey's Cotton-seed Meal Guano...	Wake Forest.....	6.92	.88	.64	1.52	1.85	2.18	-----	13.01
6050	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Success Fertilizer.....	Bonlee.....	8.46	1.16	.30	1.46	1.78	2.10	-----	17.02
5633	Marietta Fertilizer Co., Greensboro, N. C.	Marietta Solid South.....	Concord.....	7.84	1.11	.52	1.66	2.02	1.94	-----	16.99
5178	Martin Fertilizer Co., Norfolk, Va.....	Martin's Carolina Cotton Guano...	Goldsboro.....	8.20	.94	.98	1.92	2.33	2.74	-----	19.72
5902	Meadows, E. H. & J. A. Co., New Bern, N. C.	Meadows' Cotton Guano.....	New Bern.....	7.05	.76	1.04	1.80	2.19	1.72	-----	16.47
5498	Miller Fertilizer Co., Baltimore, Md.	Ammoniated Dissolved Bone.....	Pittsboro.....	8.59	.98	.58	1.56	1.89	2.04	-----	17.44
5697	do.....	do.....	Mount Airy.....	7.85	1.28	.44	1.72	2.00	1.86	-----	17.11
5305	Navassa Guano Co., Wilmington, N. C.	Navassa Cotton-seed Meal Guano...	Clinton.....	8.72	1.18	1.02	2.20	2.67	2.65	-----	21.20
5205	do.....	do.....	Indian Trail.....	9.31	.90	.76	1.66	2.02	1.96	-----	18.35
6150	do.....	do.....	Stedman.....	7.78	.70	1.04	1.74	2.11	2.30	-----	17.87
5510	do.....	Navassa Grain Fertilizer.....	Maiden.....	9.02	.84	.60	1.44	1.75	1.88	-----	17.07
5631	N. C. Cotton Oil Co., Charlotte, N. C.	Majestic Fertilizer.....	Concord.....	8.19	.62	1.04	1.66	2.02	2.36	-----	18.02
5496	N. C. Cotton Oil Co., Henderson, N. C.	Henderson Cotton Grower.....	Apex.....	8.53	.50	1.06	1.56	1.89	2.14	-----	17.55
6170	N. C. Farmers Union, Statesville, N. C.	Farmers' Union 8-2-2 Guano.....	Lumber Bridge.....	7.59	1.14	.52	1.66	2.02	2.44	-----	19.60
5661	do.....	do.....	Hoinny.....	7.63	1.54	.48	2.02	2.46	2.44	-----	19.09
5865	do.....	do.....	Icard.....	7.38	1.09	.46	1.54	1.87	1.92	-----	16.07
5165	New Bern Cotton Oil and Fertilizer Co., New Bern, N. C.	Craven County Guano.....	New Bern.....	7.96	.58	1.22	1.80	2.19	2.54	-----	18.68
5813	Norfolk Fertilizer Co., Norfolk, Va.	Oriana Crop Grower.....	Mount Airy.....	8.07	1.32	.34	1.66	2.02	2.42	-----	18.02
5676	Ober, G., & Sons Co., Baltimore, Md.	Ober's Special Cotton Compound...	Louisburg.....	8.09	.94	.90	1.84	2.24	2.24	-----	18.45
5883	do.....	do.....	Pelham.....	8.24	.94	.90	1.84	2.24	2.12	-----	4.30
5494	Old Buck Guano Co., Richmond, Va.	Old Buck Saxon Corn and Tobacco...	Apex.....	7.96	1.36	.56	1.92	2.33	2.16	-----	18.52
5502	do.....	do.....	Norwood.....	7.93	1.32	.60	1.92	2.33	2.18	-----	18.52
5556	Palmetto Guano Corporation Columbia, S. C.	Palmetto Special Fertilizer.....	Charlotte.....	7.77	1.38	.34	1.72	2.00	1.94	-----	17.17
5598	Pamlico Chemical Co., Washington, N. C.	Pamlico Bone and Fish Guano.....	Zebulon.....	8.10	1.06	.58	1.64	1.99	1.98	-----	17.22

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100								Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash from Total	Potash from Muriate	Potash from Sulphate		Chlorine
Brands claiming													
5759	Patapasco Guano Co., Baltimore, Md.	Planter's Favorite	Walnut Cove	8.00			1.65	2.00	2.00				\$17.20
5493	do.	Sea Gull Ammoniated Guano	Sanford	8.11	1.72	.42	2.14	2.60	2.48				20.07
6202	do.	do.	Duke	7.91	1.14	.31	1.78	2.16	2.26				18.03
5354	Peruvian Guano Corporation, Charleston, S. C.	Standard Peruvian Mixture	Nashville	8.08	1.31	.38	1.72	2.03	2.10				17.72
5902	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Bone and Peruvian Mixture	Oxford	7.59	1.00	.61	1.61	1.99	2.00				16.79
5774	do.	Piedmont Cultivator Guano	Monroe	8.23	1.30	.80	2.10	2.55	1.98				19.17
5261	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' Standard Fertilizer	Morven	7.93	.46	1.22	1.68	2.04	1.92				17.12
5580	Pocahontas Guano Co., Lynchburg, Va.	Carrington Banner Guano Brand	Louisburg	9.82	.81	1.12	1.96	2.38	1.56				19.53
5584	do.	do.	Stoneville	8.76	2.14	.46	2.60	3.16	2.28				22.16
5732	Pocomoke Guano Co., Norfolk, Va.	Electric Crop Grower	Sylva	7.96	.98	.94	1.82	2.21	2.12				18.05
5294	do.	Pamlico Superphosphate	Denton	7.92	1.32	.36	1.68	2.04	1.92				17.11
5561	do.	do.	Marshville	8.04	1.50	.40	1.90	2.31	2.12				18.44
5318	Powhatan Chemical Co., Richmond, Va.	Magie Cotton Grower	Crouse	8.02	1.50	.42	1.92	2.33	1.94				18.20
5729	do.	Magie Tobacco Grower	No. Wilkesboro	8.38	.88	.80	1.68	2.04	2.18				17.97
6122	do.	do.	Mount Airy	8.46	1.10	.80	1.90	2.31	1.92	1.92	5.60		18.48
5457	Rasin-Monumental Co., Baltimore, Md.	Rasin's Empire Guano	Angier	8.08	1.08	.66	1.74	2.11	1.98	1.98	4.90		16.56
5927	do.	do.	Mooresville	8.64	1.92	.34	2.26	2.75	2.70				21.41
				8.90	1.10	.46	1.56	1.89	1.88				17.45

5607	do.	Waxhaw	8.27	1.04	.50	1.54	1.87	1.90	16.83
5230	Reidsville Fertilizer Co., Reidsville, N. C.	Reidsville	7.70	1.04	.72	1.76	2.14	2.00	17.37
5231	do.	Reidsville	7.63	1.52	.90	2.42	2.94	.76	17.84
5380	Richmond Guano Co., Richmond, Va.	Mooresville	7.60	1.08	.78	1.86	2.26	2.28	18.16
5815	do.	Pilot Mountain	8.36	1.04	.54	1.58	1.92	2.10	3.60 17.41
6058	Robeson Mfg. Co., Lumberton, N. C.	St. Paul	7.41	.66	.82	1.48	1.80	2.04	16.06
5320	Robertson Fertilizer Co., Norfolk, Va.	Shelby	8.85	1.22	.54	1.76	2.14	1.72	17.93
6224	do.	Fayetteville	7.75	1.02	.66	1.68	2.04	1.78	16.72
6225	Farmer's Bone Fertilizer	Vander	7.63	1.22	.50	1.72	2.09	2.00	17.15
6151	Farmers' Bone Fertilizer	Stedman	7.52	.98	1.00	1.08	1.31	2.06	16.99
5702	Farmers' Bone Fertilizer for Tobacco	Pilot Mountain	7.72	1.14	.56	1.70	2.07	1.84	1.84 16.83
5492	Farmers' Friend Fertilizer	Pittsboro	7.66	1.22	.52	1.74	2.11	2.18	17.56
5668	Our Special Cotton-seed Meal Guano.	Wake Forest	7.24	1.08	.70	1.78	2.16	2.08	17.17
5887	Our Favorite	Stoneville	9.01	.88	.68	1.56	1.89	2.18	18.05
6060	Gloria Standard Fertilizer	Lumberton	8.41	.82	.96	1.78	2.16	2.24	18.50
5854	do.	Norwood	7.72	.92	1.72	1.74	2.11	1.96	17.24
5840	do.	Davidson	7.02	.42	1.20	1.62	1.97	2.66	17.32
6277	Fayetteville Oil Mill Standard	White Oak	8.50	.80	1.16	1.96	2.18	2.32	19.43
5648	do.	Autryville	8.31	.64	.98	1.62	1.97	1.82	17.05
6167	do.	Fayetteville	7.81	.41	.98	1.42	1.73	2.06	16.21
5586	Standard Fertilizer	Aboskie	7.41	.58	1.00	1.58	1.92	2.04	16.46
5608	Double Two	Marshville	8.63	.24	1.62	1.86	2.26	2.58	19.59
5636	Georgia Standard Fertilizer	Morven	10.27	.92	.48	1.40	1.70	2.34	18.82
5895	Tiger Brand Corn Grower	Hendersonville	8.14	.94	.62	1.56	1.89	2.70	18.16
5149	Farmers Supply Co.'s Cotton and Corn Fertilizer.	Edenton	8.20	1.48	.42	1.90	2.31	1.98	18.35
5559	Swift's Compound Standard Grade Guano.	Goldsboro	9.89	.58	1.36	1.94	2.36	2.30	20.57



6065	...do.....	...do.....	Kings Mountain	8.95	1.06	.54	1.60	1.94	1.92	-----	17.72
5446	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand Fertilizer.	Stovall	8.76	1.06	.52	1.58	1.92	1.98	-----	17.57
5432	...do.....	...do.....	Hendersonville	8.70	1.04	.60	1.64	1.99	2.40	-----	19.37
5713	...do.....	Allison & Addison's Old Hickory Guano.	Tabor	7.68	.92	.56	1.48	1.80	2.30	-----	16.74
5940	...do.....	Atlantic-Virginia Fertilizer Co.'s Eureka Ammoniated Bone.	Scotus	8.61	1.30	.38	1.63	2.04	2.88	-----	19.36
5671	...do.....	Charlotte Oil and Fertilizer Co.'s King Cotton Grower.	Wake Forest	8.10	.62	1.24	1.86	2.26	1.92	-----	17.99
5378	...do.....	Davie & Whittle's Owl Brand Guano	Weaverville	8.63	1.03	.76	1.84	2.24	1.84	-----	18.30
5453	...do.....	Durham Fertilizer Co.'s Genuine Bone and Peruvian Guano.	Angier	8.88	.94	.52	1.46	1.78	1.90	-----	17.06
5799	...do.....	Electric Standard Guano.	Climax	7.07	1.22	.64	1.86	2.26	1.53	-----	16.50
5914	...do.....	Farmers' Friend Fertilizer.	Topton	8.01	1.18	.56	1.74	2.11	2.00	-----	17.57
5732	...do.....	King Cotton Grower.	Graham	8.13	.62	1.16	1.78	2.16	1.74	-----	16.39
5517	...do.....	Navassa Cotton-seed Meal Guano.	Kenly	8.03	.96	1.06	2.02	2.46	2.52	-----	19.64
5745	...do.....	Norf. and Car. Chem. Co.'s Genuine Slaughter-house Bone Guano.	Ansonville	8.55	1.20	.56	1.76	2.14	1.94	-----	18.30
5499	...do.....	Old Dominion Guano Co.'s Farmers' Friend Fertilizer.	Seagrove	7.74	1.44	.56	2.00	2.43	1.92	-----	18.23
5296	...do.....	Old Dominion Guano Co.'s Soluble Guano.	Thomasville	8.20	1.14	.56	1.70	2.07	1.96	-----	17.51
5576	...do.....	...do.....	Franklinton	8.63	1.12	.44	1.56	1.89	1.88	-----	17.20
6148	...do.....	Old Dominion Guano Co.'s Soluble Tobacco Grower.	King	7.40	1.28	.58	1.86	2.26	2.06	-----	17.60
5473	...do.....	...do.....	Henderson	8.14	1.14	.46	1.60	1.94	1.93	-----	17.03
5712	...do.....	Powers, Gibbs & Co.'s Cotton-seed Meal Soluble Guano.	Fair Bluff	8.76	.74	1.03	1.82	2.21	1.96	-----	18.50
5897	...do.....	Southern Chemical Co.'s Electric Standard Guano.	Penrose	8.61	1.00	.54	1.54	1.87	2.01	-----	17.38
6085	...do.....	Tinsley & Co.'s Stonewall Guano	Bullock	9.13	.74	.44	1.18	1.43	1.84	-----	16.03
5277	...do.....	Travers & Co.'s Beef, Blood and Bone.	N. Wilkesboro.	9.65	1.03	.34	1.42	1.73	1.84	-----	17.49
5392	...do.....	Travers & Co.'s National Fertilizer.	High Point	8.85	1.02	.66	1.63	2.01	2.12	-----	18.29
5463	...do.....	Travers & Co.'s National Special Tobacco Fertilizer.	Durham	8.17	1.36	.52	1.88	2.23	2.01	-----	18.34
5222	...do.....	V.-C. Co.'s Ajax	Chadbourn	8.05	.83	1.02	1.9	2.31	2.28	-----	18.72
5562	...do.....	V.-C. Co.'s Diamond Dust.	Marshville	8.21	.60	.94	1.54	1.87	2.34	-----	17.36



5528	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Smith's Irish Potato Guano.	Asheville	8.40	1.28	.28	1.56	1.89	9.44	-----	29.85
5379	do.	do.	Statesville	9.23	1.16	.28	1.44	1.75	8.96	-----	29.30
	<b>Brand claiming</b>			8.00	-----	-----	1.85	2.25	2.00	-----	18.00
5809	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union	Mount Airy	7.68	1.24	.74	1.98	2.41	2.76	-----	19.52
	<b>Brand claiming</b>			8.00	-----	-----	2.06	2.50	1.00	-----	17.14
5458	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' Blood, Bone, and Potash	Dunn	8.68	1.24	1.14	2.38	2.89	.80	-----	18.69
	<b>Brands claiming</b>			8.00	-----	-----	2.06	2.50	2.00	-----	18.84
6055	Acme Mfg. Co., Wilmington, N. C.	Latimer's Complete Fertilizer	Clarkton	7.63	1.40	.60	2.00	2.43	1.90	-----	18.14
5634	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Ammoniated Dissolved Bone Phosphate.	Concord	8.63	1.34	1.28	2.62	3.19	3.04	-----	23.41
6051	Navassa Guano Co., Wilmington, N. C.	Ammoniated Soluble Navassa Guano	Gulf	9.25	1.72	.46	2.18	2.65	1.98	-----	20.44
5961	Ober, G., & Sons Co., Baltimore, Md.	Cooper's Pungo Guano for All Crops	Providence	9.06	1.54	.48	2.02	2.46	2.46	-----	20.42
5710	Swift & Co., Fertilizer Works, Wilmington, N. C.	Swift's Sumatra Tobacco, High Grade.	Selma	8.27	.66	1.34	2.00	2.43	2.10	.64	19.01
5491	Union Seed and Fertilizer Co., Raleigh, N. C.	Raleigh Standard	Apex	8.12	1.00	1.40	2.40	2.92	1.80	-----	19.97
5978	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Anchor Brand	Roxboro	9.63	1.40	.26	1.66	2.02	1.54	-----	17.92
	<b>Brands claiming</b>			8.00	-----	-----	2.06	2.50	2.50	-----	19.69
5975	American Agricultural Chemical Co., New York, N. Y.	Slingluff's British Mixture	Roxboro	7.91	1.54	.50	2.04	2.48	2.48	-----	19.49
5227	American Fertilizer Co., Norfolk, Va.	Bob White Fertilizer for Tobacco	Reidsville	8.13	1.68	.38	2.06	2.50	2.86	4.50	20.42
	<b>Brands claiming</b>			8.00	-----	-----	2.06	2.50	3.00	-----	20.54
5190	Acme Mfg. Co., Wilmington, N. C.	Tip Top Tobacco Grower	Mount Olive	7.85	.84	1.20	2.04	2.43	3.06	7.90	20.43
5254	Armour Fertilizer Works, Greensboro, N. C.	Armour's Gold Medal for Tobacco Fertilizer.	Mount Airy	7.98	1.14	.88	2.02	2.46	3.20	-----	20.79
5814	American Agricultural Chemical Co., New York, N. Y.	Pine Island Guano	Pinnacle	8.14	1.34	.66	2.00	2.43	3.04	-----	20.49
6102	do.	Zell's Bright Tobacco Grower	Asheville	7.65	2.32	.30	2.62	3.19	3.28	2.12	22.92
5412	American Fertilizer Co., Norfolk, Va.	American No. 1 Fertilizer	Macesfield	8.30	1.50	.96	2.46	2.99	2.80	-----	22.07
5705	Ashepoo Fertilizer Works, Charleston, S. C.	Pine Island Tobacco Guano	Selma	7.91	1.46	.78	2.24	2.72	3.04	.26	21.25
5371	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Caraleigh Special Tobacco Guano	Spring Hope	7.31	.98	1.30	2.28	2.77	3.68	3.68	23.95
5288	Columbia Guano Co., Norfolk, Va.	Torpedo Tobacco Guano	Hazelwood	8.23	1.46	.66	2.12	2.58	3.06	7.60	21.09

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100										Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Murate	Sulphate	Chlorine		
Brands claiming														
60657	Cooper Guano Co., Wilmington, N. C.	Cooper's Banker Hill	St. Paul	8.00			2.06	2.50	3.00					\$20.54
5805	Farmers Guano Co., Raleigh, N. C.	Toco Tobacco Guano	Roxboro	8.21	2.02	.34	2.36	2.87	3.30					22.44
6012	Georgia Chemical Works, Augusta, Ga.	Thunderbolt Tobacco Special	Greensboro	8.33	.62	1.82	2.44	2.97	2.90	2.90		4.70		22.19
5523	do	do	Franklinton	8.01	1.64	.70	2.31	2.84	3.38	3.38		5.70		22.31
6330	do	do	Silchem	8.19	1.78	.38	2.16	2.63	3.10	3.10		5.60		21.55
6025	Horne, Ashley, & Son, Clayton, N. C.	Pride of Clayton	Smithfield	8.80	1.71	.32	2.06	2.50	2.92	2.92		3.90		21.12
5503	Imperial Co., Norfolk, Va.	Bright Tobacco Guano	Eagle Springs	8.93	.92	1.21	2.16	2.63	3.00					21.78
6026	Lister's Agricultural Chemical Co., Newark, N. J.	Lister's Special Tobacco Fertilizer	Selma	8.36	1.84	.40	2.24	2.72	3.22	3.22		5.00		21.96
5833	Miller Fertilizer Co., Baltimore, Md.	Miller's High Grade	Lilesville	8.17	1.41	.44	1.88	2.29	2.88	2.88		3.90		20.04
5345	Navassa Guano Co., Wilmington, N. C.	Mogul Guano	Maysville	8.13	1.54	.52	2.06	2.50	3.02					20.69
6018	do	Sullivan's Tobacco Guano	Walnut Cove	8.93	1.54	.40	1.94	2.36	2.86					20.66
5700	Old Buck Fertilizer Co., Richmond, Va.	Old Buck High Prize Tobacco Fertilizer	Pinnacle	8.40	1.66	.32	1.98	2.41	2.90	2.90		3.80		20.41
5803	Pamlico Chemical Co., Washington, N. C.	Quick Grower Guano	Beaufort	8.31	1.70	.60	2.30	2.80	2.88	2.88		3.40		21.37
5817	Patapsco Guano Co., Baltimore, Md.	Patapsco Special Tobacco Mixture	Pilot Mountain	8.73	1.61	.70	1.74	2.11	2.88					19.70
5651	do	Unicorn Guano	Biltmore	8.45	1.56	.41	2.00	2.43	2.72	2.72		3.40		20.23
5885	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Guano for Tobacco	Leaksville	8.52	1.61	.38	2.02	2.16	2.48					19.96
5701	Pocahontas Guano Co., Lynchburg, Va.	Spot Cash Tobacco Compound	Pinnacle	7.82	.88	1.25	2.16	2.63	4.86	4.84	.02	3.60		23.94
				8.50	1.40	.46	1.86	2.26	2.92	2.92		4.30		20.05



5225	Powhatan Chemical Co., Richmond, Va.	White Leaf Tobacco Fertilizer.....	Wabnut Cove.....	7.98	.80	1.52	2.32	2.82	2.92	2.92	7.20	21.43
6016	Rettsville Fertilizer Co., Rettsville, N. C.	Climax Fertilizer .....	Greensboro .....	8.23	1.48	.76	2.24	2.72	2.92			21.33
6021	Richmond Guano Co., Richmond, Va.	Tip Top Tobacco Fertilizer.....	Wabnut Cove .....	8.66	1.10	.72	1.82	2.21	2.68	2.68	9.79	19.63
6052	do	Tip Top Fertilizer.....	Julian .....	8.20	1.48	.66	2.11	2.60	3.32			21.92
6078	do	do	Kernersville .....	7.24	1.18	.82	2.00	2.43	3.50			20.47
5352	Royster, F. S., Guano Co., Norfolk, Va.	Orinoco Tobacco Guano .....	Pipetops .....	8.12	.60	1.60	2.20	2.67	3.16	3.16	10.60	21.48
6289	do	do	Rocky Mount.....	8.64	1.28	.72	2.00	2.43	3.26	3.26	3.70	21.32
6294	do	do	Bedel .....	7.91	.88	.94	1.82	2.21	2.64	2.64	2.50	18.89
5763	do	Tobacco Guano .....	Pilot Mountain.....	8.10	1.42	.64	2.06	2.50	2.62			19.98
6059	Southern Cotton Oil Co., Charlotte, N. C.	S. C. O. Co.'s Red Bull .....	Clarkton .....	9.75	1.02	.98	2.00	2.43	2.42			20.89
5860	Southern Cotton Oil Co., Goldsboro, N. C.	Echo C. S. M. ....	Mount Olive .....	8.99	.44	1.18	1.62	1.94	2.82			19.36
6115	Southern Cotton Oil Co., Shelby, N. C.	All-to-good, S. C. O. Co. ....	Shelby .....	8.21	.88	1.90	1.88	2.29	2.94			19.91
5704	Venable Fertilizer Co., Richmond, Va.	Venable Alliance Tobacco Manure, No. 1. ....	Mount Airy .....	8.58	1.70	.76	2.46	2.99	3.12	2.92	8.10	22.87
5224	Va-Car. Chemical Co., Richmond, Va.	Durham Fertilizer Co.'s N. C. Official Farmers' Alliance Guano. ....	Vinecland .....	8.24	.42	1.58	2.00	2.43	3.26			20.96
6325	do	N. C. Farmers' Alliance .....	Siloam.....	9.03	2.04	.32	2.36	2.87	2.62			22.02
6322	do	Old Dominion Guano Co.'s, Osceola .....	Silcam.....	9.93	1.80	.32	2.12	2.58	2.56			21.77
5570	do	Powers, Gibbs & Co.'s Carolina Golden Best Am. Guano for Tob. ....	Elm City .....	8.60	1.38	.38	1.76	2.14	2.50	2.50	2.40	19.03
5467	do	V.-C. C. Co.'s Blue Star C. S. M. ....	Durham .....	8.40	1.28	1.10	2.38	2.89	2.68			21.64
5683	do	V.-C. C. Co.'s Superlative Cotton-seed Meal Guano. ....	Louisburg .....	8.10	.52	1.48	1.60	1.94	2.98			18.76
Brands claiming				8.00			2.26	2.75	2.00			19.64
5596	N. C. Cotton Oil Co., Raleigh, N. C.	Raleigh Standard Guano.....	Wendell.....	7.97	.96	1.42	2.38	2.89	1.98			20.06
5575	Union Seed and Fertilizer Co., Henderson, N. C.	Henderson Standard Guano .....	Youngsville .....	8.15	.82	1.24	2.06	2.50	2.02			19.01
5595	Va-Car. Chemical Co., Richmond, Va.	V.-C. Co.'s Royal Crown C. S. M. ....	Wendell .....	7.62	1.02	1.10	2.12	2.58	1.98			18.70
Brand claiming				8.00			2.26	2.75	2.50			20.49
5983	Hadley, Harris & Co., Wilson, N. C.	Hadley's Boss Guano .....	Wilson.....	7.96	1.34	1.28	2.02	3.19	2.68			22.20
Brand claiming				8.00			2.47	3.00	1.50			19.63
5950	Fremont Oil Mill Co., Fremont, N. C.	Fremont Fertilizer.....	Fremont.....	8.24	1.20	1.00	2.20	2.67	1.78			19.24



Brands claiming		8.00	2.47	3.00	3.00	22.18			
6279	Acme Mfg. Co., Wilmington, N. C.	White Oak	7.80	1.30	1.08	2.38	2.89	3.28	22.12
6267	do.	Hope Mills	7.35	1.46	1.06	2.52	3.06	3.30	22.30
5189	do.	Mount Olive	7.57	1.16	1.22	2.38	2.89	3.12	21.64
5949	do.	Fremont	7.56	1.24	.98	2.22	2.70	3.34	21.36
6280	do.	White Oak	8.00	1.06	1.04	2.10	2.55	3.04	20.77
6266	do.	Fayetteville	7.61	.86	1.22	2.08	2.53	3.20	20.61
6262	do.	Fayetteville	7.58	1.28	1.00	2.28	2.77	3.56	21.99
6265	do.	Fayetteville	7.94	1.34	1.08	2.42	2.94	3.12	22.13
5175	do.	Wilmington	7.68	1.14	1.18	2.32	2.82	3.16	21.56
6264	do.	Wilmington	7.74	1.14	1.06	2.20	2.66	3.06	20.97
6011	Augusta Chemical Works, Augusta, Ga.	Greensboro	8.79	1.74	.66	2.40	2.92	3.06	22.71
5338	American Agricultural Chemical Co., New York, N. Y.	Ayden	7.99	.78	1.62	2.40	2.92	4.70	24.78
7630	do.	Vander	8.05	1.86	.52	2.38	2.89	2.64	21.25
5337	do.	Ayden	7.64	.62	2.06	2.68	3.26	3.04	22.76
6047	do.	Goldston	8.16	1.78	.54	2.32	2.82	2.84	21.45
5145	American Fertilizer Co., Norfolk, Va.	Plymouth	8.64	.42	2.50	2.92	3.55	3.08	24.69
5460	do.	Dunn	8.26	.38	2.56	2.94	3.57	3.00	24.29
6192	Armour Fertilizer Works, Wilmington, N. C.	Fayetteville	7.68	1.92	.54	2.46	2.99	3.00	21.85
6228	do.	Fayetteville	7.91	1.78	.70	2.48	3.02	2.82	21.83
6229	do.	Fayetteville	7.96	1.90	.54	2.44	2.97	2.84	21.75
6189	do.	Fayetteville	7.83	1.78	.80	2.53	3.14	2.52	21.65
6235	do.	Cameron	6.46	1.36	.96	2.32	2.82	2.76	19.79
6215	do.	Williamston	7.01	1.12	1.48	2.60	3.16	2.96	21.74
6188	do.	Fayetteville	7.86	1.34	1.16	2.50	3.04	3.68	23.33
5252	do.	Mount Airy	8.15	1.08	1.50	2.58	3.14	3.08	22.89

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## MINED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition of Parts per 100										Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Murate	Potash from Sulphate	Choline		
Brands claiming														
6249	Armour Fertilizer Works, Wilmington, N. C.	Armour's Special for Tobacco	Greenville	8.00	1.31	.94	2.28	2.57	3.60	.40	3.20	.30	21.57	
6003	do.	do.	High Point	7.49	1.30	1.10	2.40	2.92	2.90	.61	2.26	.50	20.27	
6036	Arps, George L., & Co., Norfolk, Va.	Arps' Quick Growth for All Crops	Edenton	7.91	1.82	.62	2.44	2.97	3.22				22.35	
5688	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Corn and Wheat Special	Asheville	6.95	1.00	1.31	2.34	2.84	3.78				22.04	
5997	Atlantic Chemical Co., Norfolk, Va.	Atlantic High Grade Cotton Grower	Black Mountain	8.24	1.91	.71	2.68	3.26	3.02				23.33	
5478	do.	Atlantic High Grade Tobacco Grower	Henderson	7.65	.70	1.74	2.44	2.97	3.24	3.24		6.50	22.15	
6011	Augusta Chemical Works, Augusta, Ga.	Golden Leaf Tobacco Special	Greensboro	8.79	1.74	.66	2.40	2.92	3.06				22.71	
5202	Baugh & Sons Co., Philadelphia, Pa.	Baugh's Grand Rapids High Grade Guano	Wadesboro	7.28	.56	1.81	2.40	2.92	4.01				23.02	
5339	do.	Baugh's High Grade Tobacco Guano	Grifton	8.05	.52	2.02	2.51	3.09	3.16	3.16		1.80	22.78	
6180	do.	do.	Guilford College	7.24	1.80	.60	2.40	2.92	2.92	2.94		3.70	21.11	
5238	do.	do.	Ayden	7.89	.62	1.82	2.44	2.97	3.11	3.11		6.40	22.20	
5849	Berkley Chemical Co., Norfolk, Va.	Advance Crop Grower	Hemp	8.29	1.81	.56	2.40	2.92	2.76				21.75	
6029	do.	Berkley Tobacco Grower	Ayden	7.69	1.90	.51	2.44	2.97	3.26	3.00		8.00	22.22	
5786	Brown, H. P., Guano Co., Salisbury, N. C.	Brown's High Grade Guano	Kannapolis	8.50	1.74	.72	2.46	2.99	2.88				22.39	
5660	do.	do.	Canton	7.93	.78	1.16	2.24	2.72	2.32				20.04	
5841	Brown, H. P., Guano Co., Salisbury, N. C.	Farmers' Union 8-3-3 High Grade Guano	Mount Airy	7.97	1.56	.86	2.42	2.97	3.08				22.09	

5514	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Favorite Cotton-seed Meal Guano.	Kendy	8.05	1.40	1.00	2.40	2.92	1.84	19.97
5692	do.	Bryant's High Grade Fertilizer.	Waxhaw	8.11	2.00	.36	2.36	2.87	3.00	21.84
5257	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Tobacco Queen.	Fremont	7.90	.60	1.86	2.46	2.99	3.04	22.12
5441	Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.	Eclipse Guano.	Raleigh	8.60	1.24	1.48	2.72	3.31	3.18	24.03
5875	do.	Harris' Best	Warrenton	7.16	.96	1.64	2.60	3.16	3.26	22.39
5959	Chatham Oil and Fertilizer Co., Pittsboro, N. C.	High Land Tobacco Grower	Farrington	7.73	.44	1.78	2.22	2.70	3.22	21.31
5390	Clayton Oil Mill Co., Clayton, N. C.	Clayton Guano.	Clayton	9.51	1.54	.78	2.32	2.82	2.56	22.19
5592	do.	Planters' Favorite.	Wendell	8.20	.82	1.78	2.60	3.16	3.22	23.05
5788	Columbia Guano Co., Norfolk, Va.	Falcon Cotton Guano.	Kanapolis	8.42	1.68	.80	2.48	3.02	2.92	22.46
5264	do.	Hyco Tobacco Guano.	Kinston	7.70	.74	1.72	2.46	2.99	3.00	21.87
6266	Coe-Mortimer Co., Charleston, S. C.	Coe-Mortimer Co.'s Tobacco Special	Duke	8.61	1.34	.80	2.14	2.60	2.86	21.17
5920	Contentnea Guano Co., Wilson, N. C.	Matchless	Fremont	7.48	.96	1.36	2.32	2.82	3.46	21.89
6269	do.	Pick Leaf	Rocky Mount	8.40	1.16	1.08	2.24	2.72	4.58	24.31
5368	do.	do.	Spring Hope	8.46	1.08	1.48	2.56	3.11	3.44	23.70
5948	do.	Top Notch	Stantonsburg	8.71	1.30	1.14	2.44	2.97	3.04	22.77
5673	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union 8-3-3 Guano	Louisburg	9.10	2.26	.36	2.62	3.19	3.06	23.87
6210	do.	do.	Four Oaks	6.86	.74	1.06	1.80	2.19	3.58	19.46
6215	do.	do.	Nashville	8.02	2.04	.36	2.40	2.92	2.84	21.64
6208	do.	Farmers' Union 8-3-3 Tobacco Guano	Four Oaks	7.61	1.08	.72	1.80	2.19	3.46	19.93
5706	Cooper Guano Co., Wilmington, N. C.	Cooper Sunset C. S. M.	Fairmont	7.95	1.44	.94	2.38	2.89	3.70	22.96
6253	do.	do.	White Oak	8.35	1.20	1.04	2.24	2.72	3.00	21.57
6252	do.	do.	White Oak	8.18	1.18	.98	2.16	2.63	2.12	19.61
6186	Cotton States Fertilizer Works, Wilmington, N. C.	Cotton States Cotton and Corn Fertilizer, H. G.	Willard	8.36	2.32	.32	2.64	3.21	3.14	23.42
6187	do.	Cotton States Tobacco Fertilizer, H. G.	Willard	7.89	.76	1.96	2.72	3.31	3.30	23.59
5958	Coweta Fertilizer Co., Newman, Ga.	Coweta Perfection Tobacco Grower	Oxford	9.10	2.08	.30	2.38	2.89	2.88	22.61
5341	Craven Chemical Co., New Bern, N. C.	Duplin Tobacco Guano.	Vanceboro	7.83	1.72	.82	2.54	3.09	3.28	22.78

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Murate	Potash from Sulphate	Chlorine			
Brands claiming															
6307	Graven Chemical Co., New Bern, N. C.	Foy's High Grade Guano.	Dover	8.00				2.47	3.00	3.00					\$22.18
5193	do.	do.	Mount Olive	8.25	1.42	.94	2.36	2.87	2.98						21.93
5372	do.	Gaston High Grade Fertilizer.	Spring Hope	9.05	.78	1.46	2.24	2.72	2.73						21.74
5719	Dixie Guano Co., Suffolk, Va.	High Grade Guano.	Elenton	8.52	.90	1.66	2.56	3.11	1.80						20.97
5146	Eastern Cotton Oil Co., Hertford, N. C.	Rain-proof Cotton Grower.	Jamesville	7.98	1.28	1.28	2.56	3.11	2.92						22.39
5708	Enterprise Guano Co., Baltimore, Md.	Enterprise 3-8-2 Guano.	Selma	7.76	1.26	1.20	2.46	2.99	3.18						22.23
5942	Farmers Cotton Oil Co., Wilson, N. C.	Golden Gem Guano.	Fremont	7.40	.86	1.51	2.40	2.92	2.42						20.37
5479	Farmers Guano Co., Raleigh, N. C.	Farmers' F. G. C. Formula for Tobacco.	Oxford	7.93	1.90	.60	2.50	3.04	3.18						22.51
5643	do.	Golden Grade Guano.	Rosboro	7.68	1.50	1.04	2.54	3.09	4.18	4.18			4.50		24.18
5504	do.	do.	Mount Gilead	7.31	.91	1.90	2.81	3.45	3.28						23.51
6299	do.	Money Point Guano.	Timberland	7.23	1.30	1.40	2.70	3.28	3.46						23.19
5804	do.	do.	Rosboro	8.00	1.18	1.36	2.54	3.09	3.26						22.90
5488	Farmville Oil and Fertilizer Co., Farmville, N. C.	Congo for Tobacco.	Fountain	7.98	1.42	1.08	2.50	3.04	3.20						22.62
5821	do.	East Carolina Tobacco Grower.	Benson	8.17	1.58	.88	2.46	2.99	2.72	2.72			3.00	21.82	
5487	Farmville Oil and Fertilizer Co., Farmville, N. C.	Golden Gem.	Franklin	8.16	1.18	1.11	2.32	2.82	3.02	3.02			3.00	21.76	
5410	do.	Marlboro Tobacco Grower.	Franklin	8.17	1.54	1.10	2.61	3.21	3.54						23.93
5951	Fremont Oil Mills, Fremont, N. C.	Nahunta Special.	Fremont	7.82	1.00	1.48	2.48	3.02	3.36	3.36			3.30	22.67	
				8.56	1.76	.96	2.72	3.31	2.90						23.51

5980	.....do.....	8-3-3 Tobacco Fertilizer.....	Fremont.....	7.88	1.18	1.00	2.18	2.87	3.80	.24	3.56	.20	22.27
5986	General Mfg. Co., Norfolk, Va.....	Tobacco Special.....	Spring Hope.....	7.85	1.78	.74	2.52	3.06	2.74	2.74	-----	2.90	21.80
5574	Georgia Chemical Works, Augusta, Ga.....	Gold Leaf Tobacco Compound, C. S. M.	Youngsville.....	7.68	1.56	1.00	2.56	3.11	2.96	2.96	-----	6.40	21.98
5939	.....do.....	.....do.....	Hiddenite.....	9.10	2.36	.26	2.62	3.19	2.40	-----	-----	-----	22.75
5646	.....do.....	Intensive Formula.....	Lumber Bridge.....	7.89	2.34	.46	2.80	3.40	3.10	-----	-----	-----	22.57
5591	Hampton Guano Co., Norfolk, Va.....	P. P. P. Princess Prolific Producer.....	Wendell.....	8.30	2.10	.46	2.56	3.11	2.96	-----	-----	-----	22.74
5984	Hadley-Harris Co., Wilson, N. C.....	Golden Weed Tobacco Grower.....	Wilson.....	8.61	.96	1.42	2.38	2.89	3.24	.80	2.44	.60	22.78
5954	Home Fertilizer and Chemical Co., Baltimore, Md.	Special C. and C. Compound.....	Morven.....	9.30	2.20	.82	3.02	3.46	3.34	-----	-----	-----	26.13
5423	Hubbard Fertilizer Co., Baltimore, Md.	Hubbard's Yellow Wrapper.....	Snow Hill.....	7.90	.96	1.46	2.42	2.94	3.30	-----	-----	-----	22.40
6227	Imperial Co., Norfolk, Va.....	Imperial X. L. O. Cotton Guano.....	Fayetteville.....	10.58	1.70	.82	2.52	3.06	2.84	-----	-----	-----	24.43
6184	.....do.....	.....do.....	Fayetteville.....	8.59	1.74	.74	2.48	3.02	2.86	-----	-----	-----	22.51
6185	.....do.....	.....do.....	Fayetteville.....	7.94	.70	1.74	2.44	2.97	3.04	-----	-----	-----	22.07
5259	.....do.....	.....do.....	Mount Gilead.....	8.09	-----	-----	2.46	2.99	2.86	-----	-----	-----	21.89
5767	.....do.....	Imperial Tobacco Guano.....	Crutchfield.....	8.63	1.92	.44	2.36	2.87	3.07	3.07	-----	4.10	22.47
5665	Josey, N. B., Guano Co., Tarboro, N. C.....	Josey's Bright Leaf Tobacco Guano.....	Youngsville.....	7.80	1.42	.90	2.32	2.82	3.52	1.04	2.48	.80	22.28
6300	.....do.....	Josey's Tip Top Cotton-seed Meal and Fish Scrap Guano.	Tarboro.....	10.99	1.62	.82	2.44	2.97	3.84	-----	-----	-----	26.18
5243	.....do.....	.....do.....	Tarboro.....	6.38	.98	1.20	2.18	2.65	3.54	-----	-----	-----	20.24
5421	Lenoir Oil and Ice Co., Kinston, N. C.....	Leco Tobacco Guano.....	Snow Hill.....	7.01	1.00	1.62	2.62	3.19	3.26	1.20	2.06	.90	22.33
5876	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Complete Manure.....	Macon.....	8.58	1.76	.56	2.32	2.82	3.04	-----	-----	-----	22.17
5428	Martin Fertilizer Co., Norfolk, Va.....	Martin's Bull Head Fertilizer.....	Elizabeth City.....	8.16	.62	1.92	2.54	3.09	3.42	-----	-----	-----	23.32
5177	.....do.....	.....do.....	Goldsboro.....	7.84	.72	1.72	2.44	2.97	3.22	-----	-----	-----	22.29
5388	.....do.....	Martin's Tobacco Special.....	New Bern.....	7.87	1.24	1.06	2.30	2.80	3.12	3.12	-----	2.80	21.59
5647	Marietta Fertilizer Co., Atlanta, Ga.....	Marietta Pride of Piedmont.....	Lumber Bridge.....	7.84	1.86	.74	2.60	3.16	3.04	-----	-----	-----	22.62
5883	.....do.....	.....do.....	Aquadale.....	8.05	1.42	.98	2.40	2.92	3.14	-----	-----	-----	22.18
5820	.....do.....	Marietta Pride of Piedmont for Tobacco.	Creedmoor.....	7.50	1.24	.92	2.16	2.63	2.80	.40	2.40	.30	20.15
5553	McNair Phosphate Co., Laurinburg, N. C.	8-3-2 Ammoniated Fertilizer.....	Laurinburg.....	7.81	1.16	1.04	2.20	2.70	2.86	-----	-----	-----	20.69

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Sulfate	Potash from Chloride			
Brands claiming														
5244	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Gold Leaf Tobacco Guano	Ayden	8.00	1.02	1.91	2.96	3.00	3.54	3.54			3.10	23.91
6127	do	do	Kinston	6.66	.98	1.91	2.92	3.55	3.36	3.36			3.80	23.39
5477	Miller Fertilizer Co., Baltimore, Md.	Standard	Henderson	8.15	.68	1.90	2.58	3.11	3.18					23.06
6204	do	do	Duke	7.98	1.04	.68	2.32	2.82	2.70					21.05
5451	do	Tobacco King	Oxford	8.02	.60	1.70	2.30	2.80	2.90	2.90			5.20	21.35
5216	Navassa Guano Co., Wilmington, N. C.	Clarendon Tobacco Guano	Vineyard	8.32	.50	2.02	2.52	3.06	3.26	3.26			5.20	23.13
5358	do	Navassa Blood and Meal Mixture	Bethel	8.56	.60	1.78	2.38	2.89	4.32					24.59
5357	do	Navassa Carolina Tobacco Grower	Bethel	8.80	1.00	1.40	2.40	2.92	1.94	1.94			1.90	20.82
5969	do	Navassa Grain Guano	Hickory	9.01	2.56	.22	2.78	3.38	4.52					26.91
5307	do	Navassa High Grade Guano	Clinton	8.18	.42	2.32	2.78	3.38	3.40					24.26
5344	do	Navassa Standard Meal Guano	Maysville	8.15	1.00	1.51	2.51	3.00	2.94					22.49
5682	N. C. Cotton Oil Co., Charlotte, N. C.	Dixie Standard Fertilizer	Concord	8.21	1.84	.28	2.12	2.58	2.22					19.64
5666	N. C. Cotton Oil Co., Raleigh, N. C.	Raleigh Special Guano	Wake Forest	7.95	.96	1.40	2.36	2.87	3.00					21.69
6306	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union S-2-3 Guano	Wake Forest	8.61	2.14	.44	2.58	3.14	3.18					23.47
6196	do	do	Raeford	8.25	.50	2.08	2.58	3.14	3.00					22.84
6197	do	do	Lumber Bridge	8.15	.50	2.02	2.52	3.06	3.10					22.68
6251	do	do	Greenville	7.66	1.86	.70	2.56	3.11	3.16					22.51



5838	do.....	do.....	Statesville.....	7.40	2.00	.46	2.46	2.99	2.94	-----	21.50		
5843	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Harvey's Special Meal and Fish Guano.	Gritton.....	7.65	.82	1.80	2.62	3.19	3.32	-----	23.01		
5166	do.....	Lenoir Bright Leaf Tobacco Grower	New Bern.....	8.75	1.26	1.10	2.36	2.87	3.12	7.00	22.62		
5245	do.....	Special C. S. M. Mixture.....	Ayden.....	8.23	1.78	1.18	2.96	3.60	3.22	-----	24.92		
6169	Norfolk Fertilizing Co., Norfolk, Va.....	Oriana Tobacco Guano.....	Stedman.....	8.36	2.06	.48	2.54	3.09	2.96	4.20	22.72		
5882	Ober, G., & Sons Co., Baltimore, Md.....	Ober's Special Compound for To- bacco.	Pellham.....	8.53	1.54	.96	2.50	3.04	3.18	2.12	1.60	23.08	
5308	do.....	do.....	Wallace.....	8.18	.94	1.60	2.54	3.09	3.10	3.10	2.90	22.79	
6295	do.....	do.....	Oxford.....	8.36	1.52	.88	2.40	2.92	3.08	3.08	2.60	22.36	
5495	Old Buck Guano Co., Richmond, Va.....	Old Buck Guano Co.'s Quincy To- bacco and Garden Guano.	Apex.....	7.83	1.78	.76	2.54	3.09	3.16	3.16	6.70	22.58	
5699	do.....	do.....	Reidsville.....	7.58	1.90	.72	2.62	3.19	3.00	3.00	6.60	22.40	
5501	do.....	Old Buck Guano Co.'s Best Cotton Guano.	Norwood.....	7.76	1.82	.76	2.58	3.14	2.94	-----	22.30		
5508	do.....	Old Buck Guano Co.'s Guide-Post Cotton Guano.	Statesville.....	8.30	1.96	.68	2.64	3.21	2.94	-----	23.03		
5557	Palmetto Guano Corporation, Columbia, S. C.	Palmetto High Grade Guano.....	Charlotte.....	8.02	2.10	.44	2.54	3.09	2.92	-----	22.34		
5346	Pamlico Chemical Co., Washington, N. C.	Pamlico Fish Mixture for Tobacco.....	Ayden.....	7.60	1.86	.88	2.74	3.33	3.18	3.18	8.40	23.21	
5168	do.....	Tobacco Growers' Friend.....	LaGrange.....	7.50	1.14	1.40	2.54	3.09	3.66	3.66	9.70	23.13	
5606	Patapsco Guano Co., Baltimore, Md.....	Choctaw Guano.....	Monroe.....	8.04	2.06	.44	2.50	3.04	2.94	-----	22.23		
5566	do.....	Patapsco Gold Leaf Cotton-seed Meal Mixture.	Elm City.....	8.73	1.64	.66	2.30	2.80	3.12	-----	22.36		
5449	do.....	Patapsco High Grade Tobacco Special.	Oxford.....	8.34	1.22	1.44	2.66	3.23	3.62	1.32	2.30	1.90	24.29
6147	do.....	do.....	Selma.....	8.05	1.76	.72	2.48	3.02	2.94	.52	2.42	.40	22.18
6145	Pearsall & Co., Wilmington, N. C.....	Pearsall's F. F. G. Guano.....	Red Springs.....	7.55	1.44	.96	2.40	2.92	3.00	-----	21.49		
5709	do.....	Pearsall's High Grade Guano.....	Tabor.....	7.75	.90	1.92	2.82	3.43	3.72	-----	24.58		
6231	do.....	Pearsall's Tobacco Guano.....	Kerr.....	7.78	1.34	1.14	2.48	3.02	3.08	3.08	3.10	22.16	
6278	do.....	Pearsall's Use-Me High Grade Guano.	White Oak.....	7.98	1.18	1.40	2.58	3.14	3.76	-----	23.89		
6146	do.....	do.....	Red Springs.....	6.93	1.14	1.28	2.42	2.94	3.86	-----	22.48		
6232	do.....	do.....	Kerr.....	8.09	1.12	1.14	2.26	2.75	2.88	-----	21.22		
5355	Peruvian Guano Corporation, Charles- ton, S. C.	Lobos Peruvian Mixture.....	Nashville.....	7.80	1.88	.52	2.40	2.92	2.98	-----	21.69		

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100								Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash from Muriate	Potash from Sulphate	Chlorine	
	<b>Brands claiming</b>			<b>8.00</b>			<b>2.47</b>	<b>3.00</b>	<b>3.00</b>			<b>\$22.18</b>
6155	Phillips Fertilizer Co., Washington, N.C.	Phillips Cotton and Corn Guano...	Washington...	8.24	.72	1.80	2.52	3.06	3.30			23.11
5190	do.	Phillips' Tobacco Guano...	Washington...	9.95	.60	1.84	2.44	2.97	3.18	.40	2.78	24.12
6156	do.	do.	Washington...	8.61	.50	1.94	2.44	2.97	3.21	.92	2.32	23.04
5418	Piedmont-Mount Airy Guano Co., Baltimore, Md	Levering's Reliable Tobacco Guano	Kinston...	7.85	.94	1.60	2.54	3.09	3.51	3.54	3.40	23.24
5775	do.	Piedmont High Grade Ammoniated Bone and Potash, Tar River Special	Monroe...	8.15	1.06	1.36	2.42	2.94	2.80			21.77
5991	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	do.	Rocky Mount...	9.13	.60	1.80	2.49	2.92	1.98			21.18
6291	do.	do.	Rocky Mount...	8.19	.50	1.86	2.36	2.87	2.08			20.35
5260	Planters Fertilizer and Phosphate Co., Charleston, S. C.	Planters' High Grade Tobacco Fertilizer.	Wadesboro...	9.30	1.22	1.26	2.48	3.02	3.20	.92	2.28	23.70
5677	Peachontas Guano Co., Lynchburg, Va.	Farmers' Favorite Apex Brand.	Louisburg...	8.50	1.00	1.30	2.30	2.80	3.34			22.53
5167	Pocomoke Guano Co., Norfolk, Va.	Monarch Tobacco Grower.	New Bern...	8.17	1.80	.64	2.44	2.97	2.96	2.96	6.90	22.14
5796	do.	Pocomoke Tobacco Grower.	Pleasant Garden	8.53	1.84	.52	2.36	2.87	2.32	2.32	3.50	21.06
5728	Powhatan Chemical Co., Richmond, Va.	Hustler Tobacco Guano.	N. Wilkesboro...	8.42	1.36	.92	2.28	2.77	3.28	3.28	6.40	22.27
6171	do.	P. C. Co.'s Hustler	Kinston...	8.03	1.80	.96	2.76	3.36	3.22			23.74
5317	do.	do.	Crouse...	8.71	1.56	.88	2.44	2.97	3.00			22.70
6312	do.	do.	Kinston...	7.99	1.50	.94	2.44	2.97	3.01			22.12
5682	Rasin-Monumental Co., Baltimore, Md.	Rasin's Gold Standard	Laurinburg...	8.75	2.14	.46	2.60	3.46	3.00			23.37
5928	do.	do.	Moorestville...	8.78	1.96	.40	2.36	2.87	3.04			22.51

5389	do.	Rasin's Indian Brand for Tobacco.	Smithfield	9.25	2.06	.44	2.50	3.04	3.42	3.42	4.30	24.14
6218	do.	do.	Nashville.	9.41	1.38	.54	1.92	2.33	3.68	3.68	4.90	22.40
6027	do.	Rasin's Old Empire Guano Special.	Smithfield	6.82	2.42	.30	2.72	3.31	3.06			22.22
5976	Reidsville Fertilizer Co., Reidsville, N.C.	Horner's Tobacco Fertilizer.	Apex.	8.06	.92	1.28	2.20	2.67	3.28	3.28	3.30	21.63
5539	do.	Royal Fertilizer.	Reidsville.	8.39	1.26	1.00	2.26	2.75	3.06			21.79
5181	Richmond Guano Co., Richmond, Va.	Gilt Edge Fertilizer.	Rockingham.	7.91	1.84	.68	2.52	3.06	2.96			22.22
6217	do.	Gilt Edge Tobacco Fertilizer.	Nashville.	8.43	1.32	1.10	2.42	2.94	2.78	1.32	1.46	21.99
5730	do.	do.	Haw River.	7.93	1.50	1.00	2.50	3.04	2.68		5.30	21.69
5163	Royster F. S., Guano Co., Norfolk, Va.	Bonanza Tobacco Guano.	Edenton.	7.85	1.84	.76	2.60	3.16	3.06	3.06		22.67
6183	do.	Marlboro High Grade Cotton Grower.	Willard.	8.45	1.32	1.20	2.52	3.06	3.08			22.92
6233	do.	do.	Vander.	7.99	1.86	.66	2.52	3.06	3.10			22.62
5295	do.	do.	Albemarle	8.41	1.74	.74	2.48	3.02	2.86			22.35
5669	Scotland Neck Guano Co., Scotland Neck, N.C.	State Farm Cotton-seed Meal and Fish Scrap Guano.	Wake Forest.	7.81	1.50	.82	2.32	2.82	3.02			21.44
5855	Southern Cotton Oil Co., Concord, N.C.	Moon High Grade Fertilizer.	Norwood.	7.34	1.50	1.24	2.74	3.33	2.84			22.39
5839	do.	do.	Davidson.	7.51	.58	1.94	2.52	3.06	2.90			21.77
6168	Southern Cotton Oil Co., Fayetteville, N.C.	Fayetteville Oil Mill Special Cotton Grower.	Fayetteville.	8.44	.96	1.38	2.30	2.80	3.28			22.37
6222	do.	do.	Fayetteville.	8.19	.96	1.32	2.28	2.77	3.40			22.27
6223	do.	do.	Fayetteville.	8.00	1.00	1.30	2.30	2.80	3.40			22.18
6259	do.	do.	Hope Mills.	8.15	.96	1.40	2.36	2.87	3.00			21.87
6258	do.	do.	Fayetteville.	8.11	.94	1.24	2.18	2.65	3.16			21.38
6221	do.	do.	Fayetteville.	7.96	.88	1.36	2.24	2.72	3.04			21.29
6276	do.	do.	White Oak.	8.10	.86	1.32	2.22	2.70	2.92			21.13
6257	do.	do.	Hope Mills.	8.14	.84	1.32	2.16	2.63	2.98			21.03
6256	do.	Morning Glory.	Hope Mills.	8.64	.96	1.30	2.26	2.75	3.22			22.28
6301	Southern Cotton Oil Co., Goldsboro, N.C.	Edgerton's Old Reliable C. S. M.	Battleboro.	8.48	1.12	1.10	2.22	2.70	3.28			22.09
5764	do.	do.	Gritton.	7.64	1.20	.88	2.08	2.53	3.40			20.98

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100								Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Muriate	Potash from Sulphate		Chlorine
Brands claiming													
5780	Southern Cotton Oil Co., Goldsboro, N. C.	Special Cotton Grower	Enfield	8.00			2.47	3.00	3.00				\$22.18
5196	do	Thompson's Special Cotton and Tobacco Guano.	Goldsboro	7.38	.91	1.32	2.26	2.75	2.72				20.31
5419	do	do	Snow Hill	9.51	.90	1.34	2.24	2.72	1.12	3.32	.80	2.50	21.55
6002	Southern Cotton Oil Co., Shelby, N. C.	Moan High Grade Fertilizer	Snow Hill	8.23	.91	1.10	2.34	2.82	3.06	2.00	1.06	1.50	21.97
6110	do	Peacock's High Grade Fertilizer	Kings Mountain	8.73	1.11	.96	2.10	2.55	2.54				20.57
5637	Southern Cotton Oil Co., Wadesboro, N. C.	do	Shelby	8.57	.90	1.21	2.14	2.60	2.52				20.56
5150	Standard Guano Co., Baltimore, Md.	Farmers Supply Co. Cotton and Corn Fertilizer.	Morven	8.31	.68	1.10	1.78	2.16	2.70				19.19
5500	Swift Fertilizer Works, Atlanta, Ga.	C. S. M. Compound High Grade Guano.	Edenton	8.65	2.22	.60	2.82	3.13	2.74				23.72
5365	do	Carolina Tobacco Growers' High Grade Guano.	Wadesboro	7.90	1.06	1.38	2.44	2.97	2.94				21.87
5310	do	Swift's Ruralist H. G. Guano	Spring Hope	7.47	.60	1.94	2.54	3.09	3.46	.26	3.20	.20	22.76
6063	Tennessee Chemical Co., Greensboro, N. C.	Ox Surry County Tobacco Grower	Wallace	8.19	1.00	1.90	2.90	3.53	3.18				24.38
5613	do	Special Compound Guano	Louisburg	7.71	1.68	.74	2.42	2.94	2.80	.26	2.54	.20	21.38
6107	Tidewater Guano Co., Norfolk, Va.	Sho Nuf Guano, High Grade Compound Manure.	Benson	7.31	2.06	.56	2.62	3.19	3.01				22.23
6214	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Blood and Bone	Hobgood	7.26	1.66	.48	2.14	2.60	2.92				20.06
5639	do	do	Benson	8.13	1.66	.74	2.40	2.92	3.16				22.29
5638	do	Tuscarora Cotton Special	Concord	7.87	1.70	.76	2.46	2.99	2.92				21.89
6163	do	do	Concord	8.14	1.42	1.08	2.50	3.04	2.98				22.39
	do	do	Raeford	7.20	1.78	.66	2.44	2.97	3.12				21.54

6164	-----do-----	Tuscarora Tobacco Special-----	Lumber Bridge	7.81	1.22	1.10	2.32	2.82	2.96	.02	2.04	.70	21.34
6296	-----do-----	-----do-----	Zebulon-----	7.77	.54	1.50	2.04	2.48	2.92	.04	2.28	.50	20.12
6043	Union Guano Co., Winston-Salem, N. C.	Golden Leaf Special Tobacco Com-pound.	Westry-----	7.95	1.68	.42	2.10	2.55	2.68	2.08	-----	7.10	20.11
6195	-----do-----	Union Homestead Guano-----	Lumber Bridge-----	8.15	1.44	.98	2.42	2.94	2.36	-----	-----	-----	21.03
5214	-----do-----	-----do-----	Wadesboro-----	8.51	1.60	.46	2.06	2.50	2.84	-----	-----	-----	20.75
6023	-----do-----	Victor High Grade Tobacco Guano	Borch-----	8.80	1.78	.66	2.44	2.97	3.04	3.04	-----	3.50	22.85
5417	-----do-----	-----do-----	Kinston-----	7.73	1.92	.42	2.34	2.84	2.90	2.90	-----	4.70	21.25
6116	Union Seed and Fertilizer Co., Charlotte, N. C.	Dixie Standard Fertilizer-----	Shelby-----	8.15	.96	1.10	2.06	2.50	3.16	-----	-----	-----	20.75
5476	-----do-----	Pride of Vance Tobacco Fertilizer-----	Henderson-----	9.49	.94	1.54	2.48	3.02	3.26	26.00	3.00	.20	21.00
6203	Union Seed and Fertilizer Co., Raleigh, N. C.	Raleigh Special Guano-----	Apex-----	7.82	.94	1.14	2.38	2.89	3.20	-----	-----	-----	22.00
6131	Union Seed and Fertilizer Co., Wilmington, N. C.	Wilmington High Grade-----	Enfield-----	8.33	.96	1.56	2.52	3.06	3.04	-----	-----	-----	22.74
5217	-----do-----	-----do-----	Chadbourn-----	8.35	.90	1.00	2.50	3.04	3.04	-----	-----	-----	22.68
6275	-----do-----	-----do-----	White Oak-----	7.35	1.22	1.22	2.44	2.97	3.02	-----	-----	-----	21.51
5475	Vance Guano Co., Henderson, N. C.	Fish Brand Tobacco Manure-----	Henderson-----	8.40	1.90	.86	2.76	3.36	2.50	2.50	-----	3.10	22.85
6003	Venable Fertilizer Co., Richmond, Va.	Venable Choice Fertilizer-----	Kings Mountain-----	7.86	1.84	1.42	2.96	3.60	2.92	-----	-----	-----	23.88
5425	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's A. A. Guano-----	Robersonville-----	8.21	1.48	.88	2.36	2.87	2.14	-----	-----	-----	20.47
5538	-----do-----	Amazon High Grade Special-----	Burlington-----	8.53	2.42	.28	2.70	3.28	3.12	-----	-----	-----	23.78
6239	-----do-----	Davie & Whittle's Owl Brand Guano for Tobacco.	Fayetteville-----	8.87	1.86	.30	2.16	2.63	3.72	3.72	-----	5.60	22.95
5270	-----do-----	-----do-----	Kinston-----	7.43	2.14	.42	2.56	3.11	3.40	3.40	-----	4.70	22.71
5733	-----do-----	-----do-----	Southmont-----	7.78	2.06	.42	2.48	3.02	3.12	3.12	-----	3.10	22.23
6211	-----do-----	-----do-----	Hillsboro-----	8.39	1.98	.52	2.50	3.04	3.12	3.12	-----	4.70	22.85
5447	-----do-----	Durham Fertilizer Co.'s Gold Medal Brand Guano.	Stovall-----	8.01	3.30	.38	3.68	4.87	2.92	-----	-----	-----	20.89
5225	-----do-----	-----do-----	Tabor-----	8.01	2.20	.42	2.62	3.19	2.84	-----	-----	-----	22.52
6255	-----do-----	-----do-----	Fayetteville-----	7.67	2.26	.36	2.62	3.19	2.98	-----	-----	-----	22.45
5519	-----do-----	Durham Fertilizer Co.'s Yellow Leaf Tobacco, Guano.	Kenly-----	8.37	1.88	.42	2.30	2.80	3.31	3.34	-----	3.80	22.41
5722	-----do-----	Lynchburg Guano Co.'s Bright Belt Guano.	Edenton-----	8.31	2.30	.40	2.70	3.28	2.52	2.52	-----	4.10	22.56

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Muriate	Potash from Sulphate	Chlorine			
Brands claiming															
5472	Va.-Car. Chemical Co., Richmond, Va.	Norf. and Car. Chem. Co.'s Amazon High Grade Special Tob. Guano.	Henderson	8.00	2.58	.38	2.47	3.00	3.00	3.12	3.12	4.80	21.39		
5152	do	Norfolk and Carolina Chemical Co.'s Bright Leaf Tobacco Grower.	Washington	8.25	1.64	.96	2.60	3.16	3.10	3.10	3.10	4.70	23.09		
5250	do	Old Dom. Guano Co.'s Farmers' Friend Special Tobacco Fertilizer.	Greenville	8.55	1.06	1.06	2.12	2.58	3.50	3.50	3.50	5.70	22.12		
5154	do	Powers, Gibbs & Co.'s Old Ky. High Grade Tobacco Manure.	Washington	8.37	1.52	1.12	2.64	3.21	2.98	2.98	2.98	4.50	23.16		
5765	do	do	Grimesland	8.81	2.06	.22	2.28	2.77	2.96	2.96	2.96	5.20	22.08		
5151	do	Special High Grade Tobacco Fertilizer.	Washington	8.55	1.50	1.00	2.50	3.04	2.94	2.94	2.91	4.50	22.96		
5267	do	do	Kinston	8.55	1.62	1.14	2.76	3.36	2.42	2.42	2.42	6.10	22.85		
5464	do	Travers & Co.'s Big Leaf Tobacco Grower.	Durham	9.00	2.16	.36	2.52	3.06	2.60	2.60	2.60	4.50	22.60		
6024	do	do	No. Wilkesboro	8.15	1.78	.52	2.30	2.80	3.22	3.22	3.22	6.50	22.01		
5314	do	V.-C. C. Co.'s Diamond Guano.	Burgaw	8.23	1.40	1.06	2.46	2.99	3.21	3.21	3.21	6.50	22.75		
5526	do	V.-C. C. Co.'s Gold Medal Guano.	Asheville	8.82	1.92	.42	2.34	2.84	3.00	3.00	3.00	5.20	22.40		
5469	do	V.-C. C. Co.'s Gold Medal High Grade Tobacco Guano.	Gorman	8.61	2.32	.34	2.66	3.23	3.08	3.08	3.08	5.20	23.62		
5223	do	V.-C. C. Co.'s Menhaden Fish and Meal Mixture.	Tabor	7.91	1.72	.82	2.54	3.09	3.25	3.25	3.25	5.20	22.80		
5448	do	V.-C. C. Co.'s Peruvian High Grade Tobacco Guano.	Stovall	8.88	2.08	.42	2.50	3.01	3.04	3.04	3.04	4.80	23.16		
5807	do	V.-C. C. Co.'s Oldham's Special Compound for Tobacco.	Roxboro	8.79	2.02	.34	2.36	2.87	3.08	3.08	3.08	3.07	22.59		
5482	do	V.-C. C. Co.'s Red Cliff Cotton Grower.	Murray	8.23	2.26	.38	2.64	3.21	3.24	3.24	3.24	3.07	23.47		
5480	do	V.-C. C. Co.'s Royal High Grade Fertilizer.	Fountain	8.06	2.42	.32	2.74	3.33	3.24	3.24	3.24	3.07	23.72		

5404	.....do.....	V.-C. C. Co.'s Special 3 Per Cent Guano, No. 3	9.09	1.56	1.22	2.78	3.38	2.96	-----	24.33
5348	.....do.....	Va. State Fert. Co.'s High Grade Tobacco Fertilizer	6.78	1.48	1.18	2.66	3.23	4.02	-----	23.58
5293	Wilcox & Gibbs Guano Co., Charleston, S. C.	Special 8-3-3 Cot. and Corn Guano	7.64	1.06	1.82	2.88	3.50	3.40	-----	24.18
5783	Young, J. R., Fertilizer Co., Norfolk, Va.	Young's 8-3-3 Guano for Cotton	8.23	1.60	.88	2.48	3.02	2.90	-----	22.26
5880	.....do.....	.....do.....	8.16	1.38	1.00	2.38	2.89	2.94	-----	21.86
6045	.....do.....	Young's New Process Guano for Tobacco	8.23	1.40	.94	2.34	2.84	2.90	3.20	21.70
<b>Brands claiming</b>			8.00	-----	-----	2.47	3.00	3.85	-----	23.62
5252	American Fertilizer Co., Norfolk, Va.	Buyers' Special Mixture	9.83	.50	2.06	2.56	3.11	3.22	-----	24.56
6067	.....do.....	.....do.....	7.37	1.08	1.66	2.74	3.33	3.44	-----	23.44
<b>Brands claiming</b>			8.00	-----	-----	2.47	3.00	4.00	-----	23.88
6048	American Agricultural Chemical Co., New York, N. Y.	Zell's Tobacco Fertilizer	10.11	.52	1.98	2.50	3.04	3.18	3.70	24.50
5409	Farmville Oil and Fertilizer Co., Farmville, N. C.	Obelisk	7.93	1.26	1.56	2.82	3.43	3.64	-----	24.60
5758	Old Buck Guano Co., Richmond, Va.	Old Buck Test Farm Tobacco	7.70	1.86	.74	2.60	3.16	4.04	4.04	24.20
5200	Va.-Car. Chemical Co., Richmond, Va.	Charlotte Oil and Fertilizer Co.'s Groom's Special Tobacco Fert.	8.69	1.20	1.30	2.50	3.04	3.74	7.30	24.19
5590	.....do.....	V.-C. C. Co.'s Farmers' Success	9.04	1.80	.60	2.40	2.92	3.38	-----	23.48
5364	.....do.....	Lions High Grade Tobacco Fertilizer	7.42	.36	2.56	2.92	3.55	5.12	5.40	27.06
<b>Brands claiming</b>			8.00	-----	-----	2.47	3.00	5.00	-----	25.58
5303	American Fertilizer Co., Norfolk, Va.	American Tip Top Tobacco Grower	8.65	2.46	.26	2.72	3.31	5.80	6.40	28.52
5240	Columbia Guano Co., Norfolk, Va.	Yelverton Bros.' Plant Food for Tobacco	8.23	1.90	.60	2.50	3.04	5.02	5.00	25.94
5552	Fremont Oil Mill Co., Fremont, N. C.	Special Tobacco Fertilizer	8.12	1.22	.94	2.16	2.63	4.76	.12	24.04
5589	Meadows, E. H. & J. A. Co., New Bern, N. C.	Brooks' Special Tobacco Guano	7.15	1.14	1.30	2.44	2.97	4.76	.52	24.29
5246	Powhatan Chemical Co., Richmond, Va.	Tomlinson's Special Fertilizer	8.20	1.98	.62	2.60	3.16	5.38	-----	26.93
5284	Roberson Mfg. Co., Lumberton, N. C.	Globe Tobacco Special	8.35	1.50	1.16	2.66	3.25	2.40	.13	22.23
5406	Royster, F. S., Guano Co., Norfolk, Va.	Eagle Special Tobacco Guano	8.04	2.06	.76	2.82	3.43	5.14	5.14	27.25
5654	Va.-Car. Chemical Co., Richmond, Va.	Buyers' Mixture	9.23	1.18	.36	1.54	1.87	4.26	-----	21.71
5922	.....do.....	V.-C. C. Co.'s Excelsior Tobacco Special	8.51	1.74	.54	2.28	2.77	5.08	5.50	25.41

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100							Relative Value per Ton at Factory	
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Nitrate		Potash from Sulphate
Brands claiming												
5494	Craven Chemical Co., New Bern, N. C.	Craven Chemical Co.'s Standard Tobacco Guano.	Mount Olive	8.00			2.47	3.00	6.00			\$27.28
5553	Peruvian Guano Corporation, Charleston, S. C.	Puno Peruvian Tobacco Formula	Nashville	8.95	.90	1.88	2.78	3.38	5.20	5.20		4.80 28.03
Brand claiming												
5282	Pearsall & Co., Wilmington, N. C.	Pearsall's Favorite Tobacco Guano	Lumberton	7.80	.61	1.00	2.32	2.82	6.42	6.42		16.50 27.21
Brands claiming												
5996	Atlantic Chemical Co., Norfolk, Va.	Other Tobacco Guano	Hendersonville	8.00			2.88	3.50	5.00			27.22
5797	Royster, F. S., Guano Co., Norfolk, Va.	Polo Tobacco Guano	Climax	7.86	1.76	.86	2.64	3.21	5.60	5.60		9.20 27.15
6244	do	do	Greenville	7.91	2.28	.88	3.16	3.84	4.78	4.78		5.30 27.88
Brand claiming												
6003	Southern Cotton Oil Co., Spartanburg, S. C.	Sunrise High Grade Fertilizer	Tryon	8.01	2.21	.56	2.80	3.10	4.98	3.00	1.98	2.10 26.87
Brands claiming												
6037	Josey, N. B., Guano Co., Tarboro, N. C.	Josey's Cotton-seed Meal and Fish Scrap Guano.	Holgood	8.00			3.00	3.65	7.00			31.10
5180	McNair Phosphate Co., Laurinburg, N. C.	812 Ammoniated Fertilizer	Red Springs	8.10	2.30	.96	3.26	3.96	7.30			32.74
Brand claiming												
5714	Va.-Car. Chemical Co., Richmond, Va.	Tinsley & Co.'s Tobacco Fertilizer.	Fair Bluff	8.00			3.29	4.00	2.00			23.76
Brand claiming												
5795	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Special	Pleasant Garden	7.78	2.14	1.24	2.38	4.41	2.82			25.32
Brand claiming												
5180	McNair Phosphate Co., Laurinburg, N. C.	812 Ammoniated Fertilizer	Red Springs	8.52	1.88	1.08	2.96	3.60	2.36			23.52
Brand claiming												
5714	Va.-Car. Chemical Co., Richmond, Va.	Tinsley & Co.'s Tobacco Fertilizer.	Fair Bluff	8.00			3.29	4.00	2.50			24.61
Brand claiming												
5795	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Special	Pleasant Garden	7.88	2.70	.18	3.18	3.87	2.91	2.91		3.80 24.81
Brand claiming												
5795	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Special	Pleasant Garden	8.00			3.29	4.00	3.00			25.46
Brand claiming												
5795	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Special	Pleasant Garden	8.50	2.60	.84	3.44	4.18	3.30			27.02



Brands claiming		8.00	3.29	4.00	4.00	27.16
5987	American Fertilizer Co., Norfolk, Va.	8.07	.82	2.78	3.38	4.42
5953	do.	8.86	.68	3.10	3.77	4.30
5858	Armour Fertilizer Works, Greensboro, N. C.	8.00	1.08	3.08	3.74	3.94
5554	do.	8.08	2.12	3.04	3.70	3.92
5812	do.	7.83	1.68	3.02	3.67	4.20
5827	Atlantic Chemical Co., Norfolk, Va.	8.08	.88	2.24	3.12	3.79
6153	Baugh & Sons Co., Baltimore, Md.	7.88	.54	2.82	3.36	4.00
5287	Columbia Guano Co., Norfolk, Va.	8.50	.98	2.52	3.50	4.26
5573	do.	7.66	2.42	.96	3.38	4.11
6179	do.	7.95	2.08	1.06	3.14	3.82
5674	Cooperative Warehouse Co., Salisbury, N. C.	9.06	3.10	.26	3.36	4.09
5192	Craven Chemical Co., New Bern, N. C.	7.94	1.04	2.34	3.38	4.11
6135	do.	9.51	1.90	.36	2.26	2.75
5158	Eastern Cotton Oil Co., Hertford, N. C.	10.40	1.28	1.82	3.18	3.87
5593	General Mfg. Co., New York, N. Y.	7.21	2.20	.82	3.02	3.67
5395	Georgia Chemical Works, Augusta, Ga.	8.85	.28	3.06	3.34	4.06
5763	Josey, N. B., Guano Co., Tarboro, N. C.	7.50	2.08	1.32	3.40	4.13
5427	Martin Fertilizer Co., Norfolk, Va.	8.85	.76	2.24	3.00	3.65
5989	Meadows, E. H. & J. A., Co., New Bern, N. C.	7.80	2.26	1.08	3.34	4.06
5782	Miller Fertilizer Co., Baltimore, Md.	7.80	3.00	.30	3.30	4.01
6317	Navassa Guano Co., Wilmington, N. C.	8.35	2.15	.34	2.49	3.03
5556	do.	9.84	.92	2.32	3.24	3.94
6174	N. C. Farmers' Union, Statesville, N. C.	8.11	.84	2.46	3.30	4.01
6213	do.	7.72	2.42	.92	3.34	4.06

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Choline	Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Muriate	Potash from Sulphate					
Brands claiming																
5509	Old Buck Guano Co., Richmond, Va.	Old Buck Florida General Trucker	Statesville	8.00			3.29	4.00	4.00							\$27.16
6250	do.	Old Buck Tobacco Special	Greenville	7.96	2.40	.86	3.26	3.96	4.08							27.14
6090	Palmetto Guano Co., Columbia, S. C.	Palmetto High Grade Fertilizer	Maxton	7.34	2.52	.86	3.38	4.11	4.08	4.08					6.90	27.06
6038	Pamlico Chemical Co., Washington, N.C.	Bull's Eye Tobacco Guano	Edenton	8.35	2.18	.90	3.08	3.74	3.64							26.02
5170	do.	Pamlico 8-4-4 Guano	Bayboro	7.23	2.04	1.26	3.30	4.01	3.96	3.96					8.40	26.44
5161	Phillips Fertilizer Co., Washington, N. C.	Phillips' 4-8-4 Special Tob. Guano	Washington	8.11	1.08	2.34	3.42	4.16	4.24							28.19
6157	do.	do.	Washington	9.80	2.26	.98	3.24	3.94	4.44	.26	4.18			.20	29.33	
6173	Powhatan Chemical Co., Richmond, Va.	North State Special	Kinston	9.78	1.10	2.24	3.34	4.06	4.26	.80	3.46			.60	29.40	
5265	do.	do.	Kinston	8.83	.72	2.50	3.22	3.91	4.30							28.14
5147	Richmond Guano Co., Richmond, Va.	Perfection Special	Scotland Neck	7.82	.72	2.64	3.36	4.09	4.32							27.82
5485	Royster, F. S., Guano Co., Norfolk, Va.	Jupiter High Grade Guano	Greenville	8.16	.70	2.70	3.40	4.13	5.00							29.44
5266	do.	Milo Tobacco Guano	Kinston	8.01	1.04	2.70	3.74	4.55	4.42							29.68
5525	do.	Royster's H. G. Tobacco Guano	Henderson	7.93	1.00	2.56	3.56	4.33	4.02	4.02				6.50	28.21	
5861	do.	do.	Goldsboro	8.00	2.34	1.06	3.40	4.13	4.08	4.08				4.80	27.74	
6133	Southern Cotton Oil Co., Goldsboro, N.C.	High Grade Fertilizer	Enfield	7.85	2.40	.84	3.24	3.94	3.98							26.79
5182	do.	Special Mixture	Goldsboro	8.58			3.02	3.67	3.80							26.26
6106	do.	do.	Hobgood	8.91	1.56	1.32	2.88	3.50	3.92							26.20
				7.36	1.62	.78	2.40	2.92	3.52							22.21

6009	Southern Cotton Oil Co., Monroe, N. C.	Conquer High Grade Fertilizer	Marshallville	8.20	1.74	1.40	3.14	3.82	4.18	-----	27.05
5195	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Cotton-seed Meal Compound High Grade Guano.	Goldsboro	8.13	1.94	1.18	3.12	3.79	3.82	-----	26.29
5311	do.	Swift's Monarch H. G. Guano, Animal Matter Ammoniated.	Wallace	8.60	2.10	1.00	3.10	3.77	3.56	-----	26.19
5213	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Fertilizer Co.'s 8-4-4	Concord	8.12	.96	2.30	3.26	3.96	4.00	-----	27.15
5455	Union Guano Co., Winston-Salem, N. C.	Union Premium Guano	Dunn	7.31	2.70	.82	3.82	4.28	4.38	-----	28.10
5415	do.	Union Premium Tobacco Guano	Kinston	7.97	2.51	.58	3.12	3.79	4.22	4.92	4.90 26.83
5731	do.	Union Premium Guano	Gibsonville	9.03	2.28	.26	2.54	3.09	3.86	-----	24.85
6022	do.	do.	Borch	9.21	1.34	.58	1.92	2.33	4.42	-----	23.48
6268	Union Seed and Fertilizer Co., Wilmington, N. C.	Wilmington Truck Grower	Scotland Neck	8.26	1.32	1.84	3.16	3.84	4.00	-----	26.87
5313	do.	Wilmington Tobacco Grower	Wallace	8.28	1.94	1.60	3.51	4.30	3.98	3.98	9.20 28.38
5219	do.	Wilmington Truck Grower	Chadbourne	8.46	2.10	1.06	3.22	3.91	4.10	-----	27.46
6064	Venable Fertilizer Co., Richmond, Va.	Venable Sovereign Guano	Kings Mountain	11.83	2.38	.90	3.28	3.99	2.60	-----	28.19
5199	Va-Car. Chemical Co., Richmond, Va.	Carr's 8-4-4 Crop Grower	Mount Olive	9.06	.34	2.86	3.20	3.89	4.10	-----	27.92
5271	do.	Old Dominion Special Mixture for Tobacco	Kinston	7.71	.50	2.80	3.30	4.01	4.50	4.50	6.70 27.79
5823	do.	Powers, Gibbs & Co.'s Cotton Brand Ammoniated Dissolved Bone.	Benson	8.05	2.86	.40	3.26	3.96	3.74	-----	26.64
5568	do.	V.-C. C. Co.'s Durham High Grade.	Elm City	8.21	2.38	.32	2.70	3.28	3.70	-----	24.48
5221	do.	V.-C. C. Co.'s John F. Croom & Bros.' Fish and Meal Mixture.	Chadbourne	9.28	.60	2.14	2.74	3.33	3.98	-----	26.08
5251	do.	S. W. Travers & Co.'s Capital Tobacco Fertilizer.	Greenville	8.57	.26	3.10	3.36	4.09	3.04	3.04	3.70 26.32
5402	do.	V.-C. C. Co.'s Fish and Meal Mixture	Macesfield	8.46	2.20	.64	2.84	3.45	3.96	-----	25.71
5197	do.	V.-C. C. Co.'s Farmer's Choice	Goldsboro	8.13	.92	2.20	3.14	3.82	4.08	-----	26.81
5249	do.	V.-C. C. Co.'s Formula 161 for Tobacco	Greenville	8.00	2.46	.50	2.96	3.60	4.24	4.24	6.70 26.25
5440	do.	V.-C. C. Co.'s Special	Greensboro	8.81	.30	2.52	2.82	3.43	4.34	-----	26.59
5856	do.	do.	Norwood	9.88	2.54	.34	2.88	3.50	3.56	-----	26.46
<b>Brands claiming</b>				8.00	-----	3.29	4.00	5.00	-----	-----	28.86
5187	Armour Fertilizer Works, Atlanta, Ga.	Armour's 845 Fertilizer	Mount Olive	7.91	2.02	1.26	3.28	3.99	5.04	-----	28.81
6074	Royster, F. S., Guano Co., Norfolk, Va.	Cobb's High Grade for Tobacco	Bethel	7.92	2.12	1.14	3.26	3.96	4.90	4.90	7.40 28.50

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100								Relative Value per Ton at Factory	
				Available Phosphate	Water-soluble Nitrogen	Oxydized Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Phosphate	Potash from Sulphate		Chlorine
<b>Brand claiming</b>													
5961	Armour Fertilizer Works, Greensboro, N. C.	Armour's 8-10 Fertilizer	Morganton	8.00	2.36	.82	3.18	3.87	6.06				30.07
<b>Brands claiming</b>													
5521	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Best Guano	Wilson	7.66	2.51	1.26	3.80	4.62	7.00				33.94
5516	Va.-Ger. Chemical Co., Richmond, Va.	Muse's Special	Kenly	8.51	1.60	1.11	2.74	3.33	5.22				33.99
<b>Brands claiming</b>													
6128	Meadows, E. H. & J. A., Co., New Bern, N. C.	Meadows' Lobos Guano	Kinston	7.27	2.56	1.16	3.92	4.77	4.76				27.49
5530	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Virginia Fertilizer Co.'s Virginia Truckee	Asheville	9.30	3.86	.26	4.12	5.01	4.94				32.14
<b>Brands claiming</b>													
6191	Armour Fertilizer Works, Wilmington, N. C.	Armour's Blood, Bone and Potash	Fayetteville	7.47	1.98	1.81	3.82	4.61	6.84				30.30
5866	Georgia Chemical Works, Augusta, Ga.	Early Truck No. 2 Guano	Morganton	8.95	2.88	.28	3.16	3.81	7.72				33.25
5233	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Truckee	Greensboro	7.92	2.72	1.36	4.08	4.96	6.40				35.54
5527	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Special Truck Guano	Brevard	7.15	1.28	.30	1.58	5.57	7.06				33.63
5218	Union Seed and Fertilizer Co., Wilmington, N. C.	Wilmington Pride	Chadbourn	8.36	1.06	2.58	4.18	5.08	6.98				33.82
6132	do	do	Enfield	8.61	1.62	2.00	3.62	4.10	7.10				34.13
<b>Brand claiming</b>													
5834	Peruvian Guano Corporation, Charleston, S. C.	Peruvian Guano Top Dresser	Lilesville	8.00			7.00	8.50	3.50				36.76
				7.08	5.66	1.32	6.98	8.49	3.08				36.41
													34.81
													41.15
													39.53

Brand claiming		8.50	.80	.70	1.65	2.00	1.50	16.80
5755	American Fertilizer Co., Norfolk, Va., Peruvian Mixture.....	9.06	.80	.70	1.50	1.82	1.60	16.87
Brands claiming		9.00			.82	1.00	2.00	14.78
5966	Adair, A. D., & McCarty Bros., Atlanta Ga., Adair's Blood, Bone and Tankage Guano.....	9.06	.42	.34	.76	.92	2.26	15.04
5658	Atlantic Chemical Co., Norfolk, Va., Atlantic Special 1-9-2.....	9.21	.52	.50	1.02	1.24	1.92	15.63
5894	Columbia Guano Co., Norfolk, Va., Columbia Special 1-9-2 Guano.....	8.89	.50	.38	.88	1.07	1.80	14.58
5623	Powhatan Chemical Co., Richmond, Va., Magic Wheat Grower.....	9.02	.82	.20	1.02	1.24	2.20	15.94
5319	Royster, F. S., Guano Co., Norfolk, Va., Bison Special Fertilizer.....	9.33	1.48	.36	1.84	2.24	1.92	19.02
5468	Va.-Car. Chemical Co., Richmond, Va., V.-C. C. Co.'s Baltimore Special Mixture.....	9.24	.76	.32	1.08	1.31	1.98	16.00
Brands claiming		9.00			.82	1.00	3.00	16.48
5818	American Agricultural Chemical Co., New York, N. Y., Zell's Hustler Phosphate.....	9.03	.60	.34	.94	1.14	3.22	17.36
5810	American Fertilizer Co., Norfolk, Va., Captain Crop Grower.....	9.18	.72	.38	1.10	1.34	2.96	17.69
6271	Armour Fertilizer Works, Greensboro, N. C., Armour's No. 913 Fertilizer.....	9.03	.44	.48	.92	1.12	3.08	17.04
6077	Ashpoo Fertilizer Works, Charleston, S. C., Harvest Moon Grain Grower.....	7.82	.68	.32	1.00	1.22	3.34	16.72
5622	Brown, J. P., Co., Salisbury, N. C., Farmers' Union 9-1-3 Standard Grade Guano.....	7.42	.40	.56	.96	1.17	3.50	16.47
6207	Coe-Mortimer Co., Charleston, S. C., Coe-Mortimer Co.'s Tar Heel.....	9.78	.72	.24	.96	1.17	3.08	17.88
5931	Columbia Guano Co., Norfolk, Va., Columbia Grain Guano.....	8.69	.52	.40	.92	1.12	2.90	16.43
6069	Conestee Chemical Co., Wilmington, N. C., Conestee Premo Guano.....	7.96	.64	.82	1.46	1.78	2.58	17.39
5998	Cotton States Fertilizer Works, Wilming- ton, N. C., Cotton States Standard Grade Guano.....	8.97	.02	.86	.88	1.07	2.64	16.08
5789	Coveta Fertilizer Co., Newnan, Ga., Coveta Nonpareil Grain Grower.....	8.05	.52	.32	.84	1.02	2.30	14.51
5696	Georgia Chemical Works, Augusta, Ga., Georgia Ball Compound.....	7.68	.64	.40	1.04	1.26	1.98	14.44
5937	do..... Georgia Golden Grain Guano.....	9.88	1.40	.30	1.70	2.07	3.14	21.03
5851	Marietta Fertilizer Co., Greensboro, N. C., Marietta Blood and Bone Special.....	8.34	.56	.34	.90	1.09	2.96	16.14
5381	Navassa Guano Co., Wilmington, N. C., Long's Wheat and Grain Guano.....	9.56	.26	.54	.80	.97	3.00	16.90
5867	N. C. Farmers' Union, Statesville, N. C., N. C. Farmers' Union Guano, 9-1-3.....	9.95	.64	.32	.96	1.17	2.80	16.65
5743	Palmetto Guano Corporation, Columbia, S. C., Palmetto Grain Fertilizer.....	9.02	.58	.32	.90	1.09	2.94	16.72

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MINED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Muriate	Potash from Sulphate	Chlorine			
Brands claiming															
5206	Patapsco Guano Co., Baltimore, Md.	Coon Brand Guano	Lilesville	9.00	---	---	.82	1.00	3.00	---	---	---	---	\$16.48	
5635	Piedmont-Mount Airy Guano Co., Baltimore, Md.	Piedmont Cotton Grower	Concord	9.49	.61	.36	1.00	1.22	2.86	---	---	---	---	17.40	
6094	Powhatan Chemical Co., Richmond, Va.	Powhatan Grain Guano	Ashboro	9.00	.41	.52	.96	1.17	3.32	---	---	---	---	17.58	
5594	Richmond Guano Co., Richmond, Va.	Tip Top Grain Guano	Hickory	8.38	.20	.90	1.10	1.34	3.14	---	---	---	---	17.28	
5753	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Grain Guano	Sylva	8.04	.80	.14	.94	1.14	3.44	---	---	---	---	16.84	
6112	Southern Cotton Oil Co., Shelby, N. C.	Special Grain Grower	Shelby	8.65	.46	.38	.84	1.02	2.46	---	---	---	---	15.33	
5507	Swift & Co., Fertilizer Works, Atlanta, Ga.	Swift's Special Standard Guano	Newton	8.85	.30	.48	.78	.95	3.34	---	---	---	---	16.76	
5626	Union Guano Co., Winston-Salem, N. C.	B. S. Ammoniated Guano	Goodson Siding	8.65	.42	.46	.88	1.07	3.04	---	---	---	---	16.47	
5941	Va.-Car. Chemical Co., Richmond, Va.	Bernaldt's Grain and Crop Guano	Taylorsville	8.93	.68	.26	.94	1.14	3.12	---	---	---	---	17.10	
5431	do.	V.-C. C. Co.'s Bigelow's Crop Guano	Hendersonville	10.11	.60	.24	.84	1.02	2.54	---	---	---	---	16.78	
5794	do.	do.	Climax	9.21	.60	.30	.90	1.09	2.86	---	---	---	---	16.75	
6121	do.	do.	Mount Airy	8.58	.62	.28	.90	1.09	2.54	---	---	---	---	15.64	
Brand claiming				9.72	.30	.48	.78	.95	3.34	---	---	---	---	15.36	
6082	American Agricultural Chemical Co., New York, N. Y.	Canton Chemical Co.'s Baker's Spl. Wheat, Corn and Grass Mixture	Oxford	9.00	---	---	1.03	1.25	2.00	---	---	---	---	15.62	
Brand claiming				8.80	.52	.66	1.18	1.43	2.54	---	---	---	---	16.96	
Brand claiming				9.00	---	---	1.00	1.22	3.00	---	---	---	---	17.20	
5757	Old Buck Guano Co., Richmond, Va.	Old Buck James River Peanut and Corn	Siloam	8.90	.80	.44	1.24	1.51	3.30	---	---	---	---	18.58	

Brand claiming		9.00	1.65	2.00	1.00	16.40
5466	Va.-Car. Chemical Co., Richmond, Va.	9.25	.28	1.70	2.07	17.78
	Allison & Addison's Star Brand Guano.	9.00		1.65	2.00	18.10
Brands claiming		9.25	.48	1.56	1.89	17.79
5601	Ashepoo Fertilizer Works, Charleston, S. C.	8.80	.64	1.82	2.21	18.94
5832	Brown H. P., Guano Co., Salisbury, N. C.	9.75	.74	1.84	2.24	19.84
5742	Ober, G., & Sons Co., Baltimore, Md.	9.15	.70	1.04	2.11	19.38
5678	Pocomoke Guano Co., Lynchburg, Va.	9.00		1.65	2.00	19.80
Brands claiming		8.61	.60	1.50	1.82	18.44
5967	American Agricultural Chemical Co., New York, N. Y.	8.93	.46	1.70	2.07	19.32
5546	Armour Fertilizer Works, Greensboro, N. C.	9.07	.58	1.16	2.11	20.43
5328	Atlantic Chemical Co., Norfolk, Va.	8.83	.82	1.50	2.32	21.71
6247	Clayton Oil Mills, Clayton, N. C.	7.61	1.20	.90	2.10	22.49
5342	Craven Chemical Co., New Bern, N. C.	8.96	.82	.94	1.76	20.58
5309	Ober, G., & Sons Co., Baltimore, Md.	9.15	.70	1.04	1.74	19.38
5678	Pochontas Guano Co., Lynchburg, Va.	9.01	1.44	.50	1.94	21.55
5624	Powhatan Chemical Co., Richmond, Va.	8.05	1.12	.52	1.64	19.41
6008	Richmond Guano Co., Richmond, Va.	9.10	1.08	.56	1.64	19.92
5776	Royster, F. S., Guano Co., Norfolk, Va.	10.76	.82	.60	1.42	20.19
5886	Southern Chemical Co., Roanoke, Va.	9.06	.44	1.20	1.64	20.05
5841	Southern Cotton Oil Co., Davidson, N. C.	8.56	1.06	.78	1.84	20.10
6111	Southern Cotton Oil Co., Shelby, N. C.	9.00		1.85	2.25	20.60
Brands claiming		8.65	1.28	.48	1.76	20.09
6006	American Agricultural Chemical Co., New York, N. Y.	8.64	1.60	.46	2.06	21.97
6028	Berkley Chemical Co., Norfolk, Va.	8.41	1.46	.52	1.98	20.59
5944	Pocomoke Guano Co., Norfolk, Va.					

# ANALYSES OF COMMERCIAL FERTILIZERS SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory.
				Available Phosphoric Acid	Water Soluble Nitrogen	(Preferable Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Potrate	Potash from Sulphate	Chlorine		
Brand claiming				9.00	1.85	2.25	4.00							\$22.30
5172	Va.-Car. Chemical Co., Richmond, Va.	Cuban Special Mixture	LaGrange	7.65	1.22	1.41	2.36	2.87	3.86					22.89
Brand claiming				9.00	2.00	2.43	1.00							17.80
5751	Beta Fertilizer Co., Beta, N. C.	Beta Special Corn Grower	Beta	10.66	.86	.76	1.62	1.97	1.20					18.11
Brand claiming				9.00	2.06	2.50	2.00							19.74
5276	Va.-Car. Chemical Co., Richmond, Va.	Davey & Whittle's Owl Brand Special Tobacco Guano.	Elkin	8.82	1.52	.52	2.04	2.48	2.48				3.10	20.31
Brand claiming				9.00	2.06	2.50	5.00							24.84
6236	Columbia Guano Co., Norfolk, Va.	Parrish's Special	Benson	7.35	3.10	.61	3.71	4.55	4.96					30.00
Brand claiming				9.00	2.26	2.75	2.00							20.54
5188	Acme Mfg. Co., Wilmington, N. C.	Acme Cotton Grower	Goldboro	8.29	1.26	1.20	2.46	2.99	2.40					21.38
5370	Caraleigh Phosphate and Fertilizer Wks., Raleigh, N. C.	Caraleigh Pacific Tobacco and Cotton Grower.	Spring Hope	8.10	.80	1.82	2.62	3.19	2.58			2.00		22.46
6177	do.	do.	Stantonsburg	8.21	.60	2.00	2.60	3.16	2.06			5.30		21.29
6246	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union 9-21-2	Nashville	9.21	1.74	.30	2.04	2.48	2.14	2.11		2.10		20.09
5407	Farmville Oil and Fertilizer Co., Farmville, N. C.	Specific Cotton Grower	Farmville	8.96	1.00	1.28	2.28	2.77	2.38					21.23
5979	Fremont Oil Mill Co., Fremont, N. C.	Carolina C. S. M. Compound	Fremont	8.86	1.14	.76	2.20	2.67	2.38					20.82
6002	Imperial Co., Norfolk, Va.	Martin County Special Compound	Elm City	8.83	.74	1.72	2.46	2.90	2.26					21.63
5441	Navassa Guano Co., Wilmington, N. C.	Navassa Big Ball Special	Fountain	9.31	1.48	.98	2.46	2.99	3.32					23.86
5486	Pamlico Chemical Co., Washington, N. C.	Prosperity Cotton Grower.	Fountain	8.70	1.06	1.48	2.54	3.09	2.50					22.24



5565	Patapasco Guano Co., Baltimore, Md.	Patapasco Bright Tobacco Guano	Elm City	8.71	1.70	.78	2.48	3.02	2.12	2.12	2.30	21.36
5990	Planters Cotton Oil and Fertilizer Co., Rocky Mount, N. C.	Royal Cotton Grower	Rocky Mount	9.78	.96	1.76	2.42	2.94	1.88			21.68
5571	Powhatan Chemical Co., Richmond, Va.	Economic Cotton Grower	Elm City	9.26	1.28	1.12	2.40	2.92	2.48			22.15
5578	Richmond Guano Co., Richmond, Va.	Carolina Cotton Grower	Middleburg	8.90	1.22	1.22	2.44	2.97	2.32			21.71
5248	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Meal Mixture	Rocky Mount	9.35	1.64	.80	2.41	2.97	2.24			21.98
6290	do	do	Rocky Mount	8.99	.84	1.30	2.14	2.60	2.18			20.36
5351	Southern Cotton Oil Co., Goldsboro, N.C.	Goldsboro Cotton Grower C. S. M.	Nashville	9.30	.90	1.08	1.98	2.41	1.60			19.01
6044	Union Guano Co., Winston-Salem, N. C.	Union Perfect Cotton Grower	Westry	9.02	1.60	.34	1.94	2.36	2.68			20.43
5350	Union Seed and Fertilizer Co., Wilmington, N. C.	Wilmington's Mortgage Litter	Nashville	8.63	1.24	1.14	2.38	2.89	2.06			20.79
5816	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's Star Brand Special Manure	Mount Airy	7.60	1.44	.70	2.14	2.60	2.32			19.34
5465	do	Allison & Addison's Star Brand Special Tobacco Manure	Durham	9.11	2.10	.30	2.40	2.92	2.60	2.00	2.30	22.22
5424	do	Prolific Cotton Grower C. S. M.	Williamston	8.19	1.40	1.12	2.52	3.06	2.70			22.04
6270	do	do	Westry	9.36	.84	1.36	2.20	2.67	2.80			21.98
5347	do	do	Ayden	8.33	1.42	1.10	2.52	3.06	2.44			21.72
5184	do	do	Goldsboro	9.53	1.48	.62	2.06	2.50	2.08			20.35
5481	do	Southern Cotton Grower C. S. M.	Fountain	8.72	1.36	1.12	2.48	3.02	2.14			21.41
5405	do	V.-C. C. Co.'s Standard Cotton Grower	Macchesfield	9.27	1.08	1.52	2.60	3.16	2.90			23.67
5518	do	V.-C. C. Co.'s White Stem C. S. M.	Kenly	8.40	1.46	1.00	2.46	2.99	2.64			21.89
6164	do	do	Williamston	8.72	1.10	1.24	2.34	2.84	2.24			21.02
<b>Brand claiming</b>												
5183	Va.-Car. Chemical Co., Richmond, Va.	Powell's Special H. G. C. S. M.	Fair Bluff	9.00			2.26	2.75	3.00			22.24
				9.39	1.32	1.24	2.56	3.11	2.54			23.01
<b>Brands claiming</b>												
6007	Palmetto Guano Corporation, Columbia, S. C.	Palmetto State Guano	Monroe	9.03	1.10	.50	1.60	1.94	2.06			18.03
5433	Spartanburg Fertilizer Co., Spartanburg, S. C.	Tiger Brand Ball Buster	Saluda	9.03	.38	1.38	1.76	2.14	2.38			19.21

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-Soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash from Muriate	Potash from Sulphate	Chlorine			
Brands claiming														
6142	American Agricultural Chemical Co., New York, N. Y.	Sea Fowl Guano for Tobacco	Selma	9.00	1.82	.78	2.60	3.16	3.01	1.41	1.60	1.10	23.68	\$22.72
5938	do.	do.	Snow Hill	9.22	1.62	.70	2.32	2.82	3.20	1.01	2.16	.80	23.02	
5828	Ashepoo Fertilizer Works, Columbia, S.C.	Sea Fowl for Tobacco	Kernersville	9.23	1.51	.84	2.38	2.89	3.06	1.20	1.86	.90	23.03	
Brand claiming														
6010	McNair Phosphate Co., Laurinburg, N.C.	931 Ammoniated Fertilizer	Maxton	8.81	1.12	.96	2.08	2.53	1.78				19.27	
Brand claiming														
5520	Va.-Car. Chemical Co., Richmond, Va.	Powers, Gibbs & Co.'s Cotton-seed Meal Standard Guano	Kenly	9.65	1.84	.90	2.74	3.33	2.12				21.38	
Brands claiming														
5657	Armour Fertilizer Works, Greensboro, N. C.	African Cotton Grower	Canton	9.10	1.70	.72	2.42	2.91	2.78				23.08	
6190	Armour Fertilizer Works, Wilmington, N. C.	Armour's African Cotton Grower	Fayetteville	8.20	1.64	.76	2.40	2.92	2.96				22.60	
5908	Armour Fertilizer Works, Atlanta, Ga.	Armour's 9-3-3 Fertilizer	Franklin	9.01	1.46	.74	2.20	2.67	2.92				22.01	
6149	N. C. Cotton Oil Co., Charlotte, N. C.	Uncle Sam	Parkton	9.26	.94	.70	1.64	1.99	1.84				21.90	
5497	N. C. Cotton Oil Co., Henderson, N. C.	Pride of Vance Tobacco Fertilizer	Apex	9.47	1.30	1.16	2.46	2.99	3.36	.40	2.96	.30	18.02	
5891	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Sparrow's Special Tobacco Guano	New Bern	9.05	1.50	1.34	2.81	3.45	3.58	2.58		2.90	24.07	25.59
5361	Patapsco Guano Co., Baltimore, Md.	Patapsco Fertilizer	Bethel	9.17	1.92	.54	2.46	2.99	2.96				23.12	
5616	do.	Patapsco Tobacco Fertilizer	Benson	9.37	2.00	.58	2.58	3.14	2.80	2.80		2.70	23.51	
6237	do.	do.	Benson	8.99	1.96	.52	2.48	3.02	3.00	3.00		3.30	23.11	

5524	do.	Henderson	8.55	1.92	.40	2.52	3.06	3.12	3.12	7.50	23.08
5579	Pocahontas Guano Co., Lynchburg, Va.	Louisburg	9.63	.86	1.26	2.12	2.58	3.20	3.20	3.60	22.59
6020	Richmond Guano Co., Richmond, Va.	Walnut Cove	9.63	1.46	.92	2.38	2.89	3.04	3.04	6.40	23.35
5548	Union Guano Co., Winston-Salem, N. C.	Lenoir	9.61	1.92	.36	2.28	2.77	2.74	.40	2.86	22.43
5578	Union Seed and Fertilizer Co., Henderson, N. C.	Youngsville	9.36	1.02	1.56	2.58	3.14	3.26			24.29
5597	Vance Guano Co., Henderson, N. C.	Zebulon	6.49	1.68	1.10	2.78	3.38	2.70			21.55
5594	Va.-Car. Chemical Co., Richmond, Va.	Middlesex	10.65	1.90	.60	2.50	3.04	3.70			25.87
5915	do.	Topton	8.05	1.76	.38	2.14	2.60	3.42			21.62
	Brand claiming		9.00			2.47	3.00	6.00			27.38
5977	Reidsville Fertilizer Co., Reidsville, N. C.	Lion Brand Fertilizer	9.35	1.06	1.28	2.34	2.84	6.02			28.01
5762	Brands claiming		9.00			2.88	3.50	5.00			28.12
6248	American Fertilizer Co., Norfolk, Va.	Greenville	9.92	2.58	.14	2.72	3.31	5.24			27.73
6075	do.	Greenville	9.62	2.72	.12	2.84	3.45	5.04			28.59
	Richmond Guano Co., Richmond, Va.	Zebulon	9.60	1.88	.86	2.74	3.33	5.56	5.56	8.00	29.05
	Brands claiming		9.25			2.06	2.50	2.00			19.96
5567	Patapasco Guano Co., Baltimore, Md.	Elm City	9.31	1.88	.40	2.28	2.77	1.90			20.73
5579	do.		8.95	1.82	.44	2.26	2.75	2.00			20.49
	Brand claiming		10.00			.82	1.00	1.00			13.98
5625	Powhatan Chemical Co., Richmond, Va.	Lawndale	9.74	.96	.16	1.12	1.36	1.34			15.52
	Brand claiming		10.00			.82	1.00	2.00			15.68
5907	Armour Fertilizer Works, Atlanta, Ga.	Franklin	9.44	.22	.52	.74	.90	1.76			14.45
	Brands claiming		10.00			.82	1.00	3.00			17.38
5965	Adair, A. D., & McCarty Bros., Atlanta, Ga.	Spruce Pine	9.70	.62	.34	.96	1.17	3.10			17.84
5289	Columbia Guano Co., Norfolk, Va.	Hazelwood	9.96	.94	.40	1.34	1.63	2.82			19.12
5652	Royster, F. S., Guano Co., Norfolk, Va.	Waynesville	10.16	.56	.34	.90	1.09	2.94			17.74
6084	Vance Guano Co., Henderson, N. C.	Henderson	10.18	.30	.54	.84	1.02	3.40			18.30

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	(Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Muriate from Potash	Sulphate from Potash	(Chlorine		
<b>Brand claiming</b>				10.00			1.03	1.25	2.00					\$16.65
5803	Farmers Guano Co., Raleigh, N. C.	Farmers' Grain Grower	Roxboro	9.97	.76	32	1.08	1.31	1.86					16.45
<b>Brands claiming</b>				10.00			1.65	2.00	2.00					19.00
5686	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s Complete Fertilizer	Asheville	7.86	.26		1.50	1.76	2.14	1.94				17.41
5912	Marietta Fertilizer Co., Atlanta, Ga.	Royal Seal Guano	Franklin	9.68	.80	.82	1.62	1.97	2.70					19.78
<b>Brand claiming</b>				10.00			1.65	2.00	3.00					20.70
5203	Baugh & Sons Co., Norfolk, Va.	Baugh's Combination Animal Base Fertilizer	Wadesboro	9.03	1.01	.74	1.78	2.16	3.48					21.16
<b>Brand claiming</b>				10.00			1.65	2.00	4.00					22.40
5911	Marietta Fertilizer Co., Atlanta, Ga.	Langford Special	Franklin	9.70	.22	.96	1.18	1.43	3.18					18.86
<b>Brand claiming</b>				10.00			2.06	2.50	2.00					20.64
5913	Va.-Car. Chemical Co., Richmond, Va.	Dayco & Whittle's High Grade Soluble Guano	Waynesville	9.56	1.41	.66	2.10	2.55	2.44					21.15
<b>Brand claiming</b>				10.00			3.06	3.72	2.00					24.64
5241	Fremont Oil Mill Co., Fremont, N. C.	Fonco Cotton Fertilizer	Fremont	10.14	1.72	1.54	3.26	3.96	2.24					25.97
<b>Brands claiming</b>				10.00			3.29	4.00	4.00					28.96
6015	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union Tob. Guano	Reidsville	10.02	2.71	.30	3.04	3.71	3.10	.92	2.18	.70		26.99
6096	Va.-Car. Chemical Co., Richmond, Va.	V.-C. C. Co.'s Electric High Grade Special	Lexington	12.70	1.94	.36	2.30	2.80	4.10					27.60
<b>Brands claiming</b>				10.00			2.47	3.00	1.00					20.58
5360	Farmers Cotton Oil Co., Wilson, N. C.	Crop King Guano	Nashville	9.41	2.10	1.04	3.11	3.82	1.46					23.51
5283	Robeson Mfg. Co., Lumberton, N. C.	1915-E	Lumberton	10.48	1.34	1.08	2.42	2.94	1.72					22.04





6004	Brand claiming										7.50		2.00	2.43	3.00		19.85
	Southern Cotton Oil Co., Spartauburg, S. C.										Tryon		1.30	2.00	2.43	3.04	21.14
	Brand claiming													3.29	4.00	3.00	23.66
5720	Imperial Co., Norfolk, Va.										Edenton		2.88	3.30	4.01	2.78	24.82
	Brands claiming													3.29	4.00	4.00	25.36
5583	Imperial Co., Norfolk, Va.										Tunis		1.44	3.36	4.09	4.70	26.33
5426	Royster, F. S., Guano Co., Norfolk, Va.										Williamston		2.06	3.10	3.77	4.28	25.26
	Special Tobacco Guano.																3.08
6234	Royster, F. S., Guano Co., Norfolk, Va.													3.29	4.00	5.00	27.06
	Royster's Early Sweet Potato Grower.										Vander		.76	3.10	3.77	4.78	26.76
5429	Brands claiming													4.11	5.00	5.00	30.34
	Baugh & Sons Co., Philadelphia, Pa.										Elizabeth City		.64	4.14	5.03	5.02	30.59
6138	Imperial Co., Norfolk, Va.										Elizabeth City			4.26	5.18	5.06	31.47
5483	Young, J. R., Fertilizer Co., Norfolk, Va.										Conetoe		.66	4.10	4.98	5.02	30.20
	Brands claiming													4.11	5.00	7.00	33.74
5547	Armour Fertilizer Works, Greensboro N. C.										Davidson		2.10	1.64	3.74	4.55	31.59
5157	Eastern Cotton Oil Co., Hertford, N. C.										Hertford		1.92	3.48	4.23	2.94	27.84
6134	Phillips Fertilizer Co., Washington, N. C.										Washington			4.02	4.89	7.92	36.28
5268	Va.-Car. Chemical Co., Richmond, Va.										Kinston		.26	4.14	4.40	5.35	32.91
5269	do.										Kinston		.28	4.08	4.36	5.30	33.95
	Brand claiming													5.76	7.00	3.00	33.54
5929	Patapsee Guano Co. Baltimore, Md.										Mooresville		3.88	1.18	6.15	4.58	33.61
5926	Brands claiming													5.76	7.00	5.00	36.94
	Farmers Guano Co., Raleigh, N. C.										Cornelius		4.14	1.06	5.20	6.32	35.22
5153	Va.-Car. Chemical Co., Richmond, Va.										Washington		.400	5.18	5.58	6.78	38.39
6298	Brand claiming													3.29	4.00	3.00	22.76
	Farmers Guano Co., Raleigh, N. C.										Timberland			2.84	3.45	2.76	20.59

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100									Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Murate	Potash from Sulphate	Chlorine		
<b>Brand claiming</b>														
5968	Columbia Guano Co., Norfolk, Va.	Ventura Potato Producer	Marion	5.00			4.94	6.00	7.00					\$36.16
				5.28	2.92	1.02	3.94	4.79	6.84					32.14
<b>Brand claiming</b>														
5484	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Cabbage Guano	Canton	5.00			8.22	10.00	2.50					41.63
				5.11	6.04	1.04	7.68	9.34	3.34					41.00
<b>Brand claiming</b>														
5892	Va.-Car. Chemical Co., Richmond, Va.	Va.-C. C. Co.'s Sir Walter Tobacco Mixture	Washington	4.00			3.29	4.00	6.00					26.96
				4.87	3.20	.20	3.40	1.13	4.58	1.58			11.80	25.77
<b>Brands claiming</b>														
6108	Armour Fertilizer Works, Wilmington, N. C.	Armour's Top Dresser Fertilizer	Shelby	3.37	2.70	2.14	4.84	5.88	2.48					26.61
5600	Ashepoo Fertilizer Works, Charleston, S. C.	Ashepoo Gilt Edge Top Dresser	Monroe	4.18	4.66	.52	5.18	6.30	2.70					29.07
5537	Tennessee Chemical Co., Greensboro, N. C.	Ox Top Dresser	Greensboro	4.71	3.66	1.70	5.36	6.52	2.98					31.34
<b>Brand claiming</b>														
6114	Southern Cotton Oil Co., Shelby, N. C.	Peerless Top Dresser	Shelby	4.00			7.50	9.12	2.50					37.55
				3.57	4.00	1.58	5.58	6.78	3.14					30.87
<b>Brand claiming</b>														
6113	Southern Cotton Oil Co., Shelby, N. C.	Dandy Top Dresser	Shelby	4.00			9.06	11.00	2.50					44.09
				4.82	4.56	3.00	7.56	9.19	3.62					40.37
<b>Brand claiming</b>														
5903	Va.-Car. Chemical Co., Richmond, Va.	Fish Scrap	Kinston	4.00			8.23	10.00						36.56
				5.38	.66	7.84	8.50	10.34						38.84
<b>Brand claiming</b>														
5489	Young, J. R., Fertilizer Co., Norfolk, Va.	Young's 10 Per Cent Top Dresser for Spinach	Conetoe	5.00			8.23	10.00						37.46
				5.02	7.68	.44	8.12	9.87						37.00



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# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100					Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	(Organic) Nitrogen	Total Nitrogen	Equivalent to Ammonia	
				10.00				2.00	\$12.40
<b>Brands claiming</b>									
6053	Aene Mfg. Co., Wilmington, N. C.	Aene Bone and Potash.	Candler.	11.06				1.70	12.81
5973	Adair A. D., & McCarty Bros., Atlanta, Ga.	Adair's Formula.	Spruce Pine.	10.56				1.76	12.50
5723	American Agricultural Chemical Co., New York, N. Y.	Lazarotto Dissolved Phosphate and Potash.	Edenton.	10.15				1.94	12.43
5942	do.	Zell's Bone and Potash.	Statesville.	10.17				2.46	13.33
5375	Armour Fertilizer Works, Greensboro, N. C.	Armour's Phosphate Potash, No. 1	Bryson City.	10.17				1.80	12.21
6120	do.	do.	Forest City.	9.74				1.83	10.65
6080	Ashepoo Fertilizer Works, Charleston, S. C.	Ashepoo Potash Acid Phosphate	Gibsonville.	10.38				1.96	12.67
5374	Asheville Packing Co., Asheville, N. C.	Asheville Packing Co.'s 10-2	Asheville.	7.12				1.38	8.75
5332	Atlantic Chemical Co., Norfolk, Va.	Atlantic 10 and 2 Bone and Potash Mixture.	Kings Mountain	10.10				1.76	12.08
6152	Baugh & Sons Co., Norfolk, Va.	Baugh's Soluble Alkaline Superphosphate.	Gritton.	9.93				3.94	15.63
5724	Berkley Chemical Co., Norfolk, Va.	Bone and Potash Mixture.	Edenton.	10.12				1.92	12.37
6017	Bryant Fertilizer Co., Alexandria, Va.	Bryant's Bone and Potash.	Burlington.	12.45				2.44	15.35
6040	Burton, C. J., Guano Co., Baltimore, Md.	Burton's Potash Mixture.	Edenton.	9.31				2.08	11.91
5725	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 10-2	Edenton.	10.55				2.12	13.10
6123	Columbia Guano Co., Norfolk, Va.	Columbia 10 and 2 Bone and Potash Mixture.	Granite Falls.	9.66				2.12	12.30
5972	do.	do.	Marion.	10.35				1.56	11.97
6071	Conestee Chemical Co., Wilmington, N. C.	Conestee Bone and Potash.	Norwood.	9.79				2.06	12.31

6001	Cotton States Fertilizer Works, Chester, S. C.	Cotton States Potash and Acid.....	Hendersonville.....	9.76	1.78	11.81
5791	Craven Chemical Co., New Bern, N. C.	Truck and Bone Potash.....	Lexington.....	10.15	2.02	12.57
5873	Farmers Fertilizer Works, Spartanburg, S. C.	Dixie Bone and Potash.....	Eaves Siding.....	10.13	2.18	12.82
5872	do.	Red Rooster Bone and Potash.....	Harris.....	10.40	2.06	12.86
5650	Farmers Guano Co., Raleigh, N. C.	Century Bone and Potash Mixture.....	Roseboro.....	11.68	1.92	13.78
5904	Farmville Oil and Fertilizer Co., Farmville, N. C.	Bone and Potash.....	Farmville.....	9.51	1.86	11.72
5399	Georgia Chemical Co., Augusta, Ga.	do.	Asheboro.....	11.55	1.74	13.35
6254	Hampton Guano Co., Norfolk, Va.	Dauntless Potash Mixture.....	Lillington.....	11.13	1.58	12.70
6245	do.	do.	Lillington.....	11.39	1.44	12.70
5770	Imperial Co. Norfolk, Va.	Bone and Potash.....	Crutchfield.....	10.06	2.00	12.45
5956	Lister's Agricultural Chemical Works, Newark, N. J.	Lister's Dissolved Phosphate and Potash.....	Ramseur.....	10.41	1.84	12.50
5384	Navassa Guano Co., Wilmington, N. C.	Kavassa Dissolved Bone with Potash.....	Mooresville.....	10.40	1.76	12.35
5842	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union Guano Bone and Potash.....	Statesville.....	10.52	2.12	13.07
5905	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	Carteret Bone and Potash.....	Kinston.....	10.21	2.24	13.00
5563	Norfolk Fertilizing Co., Norfolk, Va.	Oriana Bone and Potash.....	Troy.....	10.60	2.52	13.82
6160	do.	do.	Stedman.....	10.60	2.26	13.38
5297	Old Buck Guano Co., Richmond, Va.	Old Buck Hartford Bone and Potash.....	Lexington.....	9.78	1.86	11.96
6118	Palmetto Fertilizer Corporation, Columbia, S. C.	Palmetto Acid and Potash Mixture.....	Shelby.....	10.18	2.10	12.73
5439	Patapsco Guano Co., Baltimore, Md.	Patapsco Soluble Phosphate and Potash.....	Hendersonville.....	10.43	2.58	13.76
6288	do.	do.	Hendersonville.....	8.93	1.94	11.13
5830	Pocomoke Guano Co., Norfolk, Va.	Pocomoke 10 and 2 Potash Mixture.....	Walkertown.....	9.98	2.42	13.10
5322	Powhatan Chemical Co., Richmond, Va.	Bone and Potash Mixture.....	Crouse.....	10.76	1.78	12.71
5462	Rasin-Monumental Co., Baltimore, Md.	Rasin's Bone and Potash.....	Angier.....	9.74	2.08	12.30
6286	Reidsville Fertilizer Co., Reidsville, N. C.	Bone and Potash.....	Siler City.....	10.10	1.94	12.39
5324	Robertson Fertilizer Co., Norfolk, Va.	Level Run Dissolved Bone and Potash.....	Shelby.....	11.02	2.04	12.39
5323	Royster, F. S., Guano Co., Norfolk, Va.	Royster's Bone and Potash Mixture.....	Mooresville.....	10.60	1.56	12.18

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## MINED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100							Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash from Sulphate	Potash from Chlorine		
Brands claiming												
5438	Royster, F. S., Guano Co., Norfolk, Va.	Roster's Bone and Potash Mixture.	Saluda	10.00				2.00			\$12.40	
5738	Southern Cotton Oil Co., Shelby, N. C.	Magnolia Standard Bone and Potash.	Henrietta	9.60				1.66			11.51	
5899	Spartanburg Fertilizer Co., Spartanburg, S. C.	Tiger Brand 10-2	Hendersonville	9.96				1.88			12.16	
5461	Swift & Co., Fertilizer Works, Atlanta, Ga.	Swift's Field and Farm Standard Grade Phosphate and Potash.	Fuquay	10.59				1.90			12.76	
6087	Tennessee Chemical Co., Wilmington, N. C.	Potash Mixture.	Louisburg	10.01				2.02			12.14	
5089	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Bone and Potash.	Craggy	9.97				1.96			12.30	
6178	Union Guano Co., Norfolk, Va.	Union Bone and Potash	Advance	13.14				2.24			15.63	
6130	do	do	Winston-Salem	11.99				1.90			14.02	
5790	Va.-Car. Chemical Co., Richmond, Va.	Allison & Addison's B. P. Potash Mixture.	Lexington	11.31				1.66			13.00	
5434	do	Davie & Whittle's Owl Brand Acid Phosphate with Potash.	Hendersonville	10.27				2.08			12.78	
5383	do	Durham Fertilizer Co.'s Blue Ridge Wheat Grower.	Statesville	10.72				1.78			12.67	
5808	do	Durham Fertilizer Co.'s Bone and Potash Mixture.	Hillsboro	11.22				1.52			12.68	
5278	do	Southern Chemical Co.'s Mammoth Wheat and Grass Grower	N. Wilkesboro	12.10				2.16			14.57	
5533	do	do	Brevard	10.96				2.32			13.81	
5084	do	Old Dominion Guano Co.'s Alkaline Bone and Potash.	Louisburg	10.28				1.68			12.11	
5382	do	do	Statesville	10.30				1.58			11.96	
5436	do	Southern Chemical Co.'s Mammoth Corn Grower.	Hendersonville	10.03				2.64			13.51	

6212	do.	do.	Statesville.	10.03	1.68	11.88
5307	do.	S. W. Travers & Co.'s Capital Bone and Potash Compound.	High Point.	12.00	2.14	14.44
5522	do.	V-C. C. Co.'s Dissolved Bone and Potash.	Kenly.	9.75	2.26	12.62
<b>Brands claiming</b>						
5662	Armour Fertilizer Works, Greensboro, N. C.	Armour's Acid Potash Fertilizer.	Canton.	9.61	3.14	13.99
5529	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 10 and 3 Bone and Potash for Grain.	Kernersville.	10.01	2.48	13.22
5739	Tuscarora Guano Co., Greensboro, N. C.	Tuscarora Bone and Potash.	Lincolnton.	9.90	3.06	14.11
<b>Brands claiming</b>						
6097	American Agricultural Chemical Co., Baltimore, Md.	High Grade Bone and Potash.	Granite Quarry.	10.94	3.94	16.54
5971	do.	do.	Hickory.	10.70	3.88	16.23
5826	do.	Ashpoo Potash and Acid Phosphate.	Benson.	11.21	3.18	15.49
5618	American Fertilizing Co., Norfolk, Va.	Double Dissolved Bone and Potash.	Dunn.	9.87	3.82	15.38
5331	Armour Fertilizer Works, Greensboro, N. C.	Armour's Superphosphate Potash Fertilizer.	Gastonia.	9.68	3.56	14.76
5333	Atlantic Chemical Co., Norfolk, Va.	Atlantic 10 and 4 Bone and Potash Mixture.	Kings Mountain.	10.35	3.90	15.94
5747	Brown, H. P., Guano Co., Salisbury, N. C.	10-4 Bone and Potash, High Grade.	Richfield.	10.03	3.78	15.45
5290	Columbia Guano Co., Norfolk, Va.	Columbia 10-8-4 Bone and Potash Mixture.	Hazelwood.	10.14	3.86	15.69
5715	Cooper Guano Co., Wilmington, N. C.	Cooper's Grain Producer.	Fairmont.	11.08	4.30	17.28
6086	Cooperative Warehouse Co., Salisbury, N. C.	Farmer's Union Bone and Potash.	Lonisburg.	12.16	3.12	16.25
5792	Coweta Fertilizer Co., Newnan, Ga.	Coweta Standard Bone and Potash.	Southmont.	10.56	3.42	15.32
5862	Craven Chemical Co., New Bern, N. C.	Craven Grain Compound.	Mount Olive.	10.86	3.08	15.01
6098	Georgia Chemical Co., Augusta, Ga.	High Grade XX Acid Phosphate.	Liberty.	10.63	3.54	15.58
5642	do.	High Grade Acid Phosphate with Potash.	Concord.	10.01	3.30	14.62
5641	Marietta Fertilizer Co., Greensboro, N. C.	Marietta Potash Special.	Concord.	9.84	3.94	15.55
5400	Miller Fertilizer Co., Baltimore, Md.	M. F. Co.'s 10 and 4.	High Point.	10.65	3.40	15.36
5362	Navassa Guano Co., Wilmington, N. C.	Navassa Wheat and Grass Grower.	Bethel.	10.49	4.78	17.57

ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.  
MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100							Relative Value per Ton at Factory	
				Available Phosphate	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Murate		Potash from Sulphate
	<b>Brands claiming</b>			10.00					4.00			\$15.80
5748	Navassa Guano Co., Wilmington, N. C.	Navassa Dissolved Bone with Potash	Wadesboro.	11.56					3.32			16.05
6161	N. C. Farmer's Union, Statesville, N. C.	N. C. Farmers' Union 10-4 Bone and Potash.	Lumber Bridge.	9.03					4.36			15.54
6305	do.	do.	Wake Forest.	10.38					3.40			15.12
5737	do.	do.	Rutherfordton.	11.51					2.58			14.74
5843	do.	do.	Statesville.	10.86					1.36			12.09
6159	Norfolk Fertilizing Co., Norfolk, Va.	Oriana Wheat Grower.	Stedman.	9.65					3.70			14.97
5401	Old Buck Guano Co., Richmond Va.	Old Buck German 10 and 4 Mixture.	High Point.	9.89					3.58			14.99
5749	Palmetto Guano Corporation, Columbia, S. C.	Palmetto Acid and Potash Mixture.	Albemarle.	9.70					4.56			15.46
5285	Pearsall & Co., Wilmington, N. C.	Pearsall's Bone and Potash Guano.	Lumberton.	9.88					3.76			15.28
5619	Pocomoke Guano Co., Norfolk, Va.	Pocomoke Bone and Potash Mixture.	Dunn.	9.73					4.04			15.62
5844	Rasin-Monumental Co., Baltimore, Md.	Rasin's Celebrated Universal Fertilizer 10-4 Bone and Potash.	Mooresville.	9.54					3.66			14.81
5955	Reidsville Fertilizer Co., Inc., Reidsville, N. C.	Bone and Potash.	Ashleboro.	10.31					3.92			15.94
5185	Richmond Guano Co., Richmond, Va.	Rex Bone and Potash Mixture.	Rockingham.	9.55					4.22			15.77
5330	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 10 and 4 Bone and Potash.	Dallas.	10.34					3.66			15.53
5315	Swift & Co. Fertilizer Works, Wilmington, N. C.	Swift's Farmers' Home High Grade Phosphate and Potash.	Burgaw.	10.11					3.56			15.35
5398	do.	do.	High Point.	9.21					4.12			15.29
6000	Southern Cotton Oil Co. Spartanburg S. C.	Quickstep High Grade Acid with Potash.	Tryon.	10.41					3.32			15.01

5627	Southern Cotton Oil Co., Shelby, N. C.	Conqueror Bone and Potash	Crouse	10.09	4.14	16.12
6072	Tennessee Chemical Co., Greensboro, N. C.	Ox Potash Formula	Stanfield	9.65	3.84	15.21
5212	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Acid and Potash	Concord	10.45	3.58	15.49
6193	do.	do.	Lumber Bridge	8.77	4.38	15.34
6194	do.	do.	Raeford	9.77	3.40	14.57
5511	Union Guano Co., Winston-Salem, N. C.	High Grade XX Acid Phosphate with Potash	Newton	9.93	3.30	14.55
5540	do.	Quaker Grain Mixture	Greensboro	9.10	4.00	14.99
5211	do.	Union 10-4 Bone and Potash	Wadesboro	11.38	4.48	17.86
6201	Union Seed and Fertilizer Works, Wilmington, N. C.	Wilmington Bone and Potash	Duke	9.76	3.58	14.87
5435	Va.-Car. Chemical Co., Richmond, Va.	Lynchburg Guano Co.'s S. W. Special Bone and Potash Mixture	Hendersonville	11.72	2.80	15.31
5226	do.	Old Dominion Guano Co.'s Obelisk Brand Bone and Potash	Chadbourn	9.53	4.42	16.09
5740	do.	do.	Lattimore	9.43	3.44	14.33
5298	do.	Southern Chemical Co.'s Winner Grain Mixture	Thomasville	10.01	3.34	14.69
5286	do.	V.-C. C. Co.'s Special Potash Mixture	Lumberton	10.08	4.36	16.48
5471	do.	do.	Durham	9.30	4.06	15.27
5470	do.	Va. State Fertilizer Co.'s XX Potash	Durham	9.27	4.16	15.41
<b>Brands claiming</b>				10.00	5.00	17.50
6209	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union 10 and 5 Bone and Potash	Four Oaks	10.95	4.38	17.30
5236	Tuscarora Fertilizer Co., Greensboro, N. C.	Alkaline Bone	Greensboro	9.55	5.06	17.20
5541	Va.-Car. Chemical Co., Richmond, Va.	Alpine Mixture	Burlington	9.78	4.10	15.77
5413	do.	Lynchburg Guano Co.'s Alpine Mixture	Macesfield	10.12	5.18	17.91
5825	do.	Va.-Car. Chemical Co.'s Standard Bone and Potash	Benson	12.68	8.46	25.79
5617	do.	Va. State Fertilizer Co.'s Mountain Top Bone and Potash	Benson	9.18	4.86	16.52

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## MIXED FERTILIZERS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100								Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Muriate	Potash from Sulphate		Chlorine
Brands claiming													
5640	Tiscaron Fertilizer Co., Greensboro, N. C.	Tiscaron Phosphate and Potash	Concord	10.00					6.00				\$19.20
5673	Va-Car, Chemical Co., Richmond, Va.	Southern Chemical Co.'s Solid South	Spring Hope	9.72					5.82				18.64
5690	do.	Va-C. Co.'s Carr's Special	Ashville	9.06					6.18				18.66
5655	do.	do.	Waynesville	10.18					5.60				18.68
				9.84					5.52				18.24
Brand claiming													
5437	Spartanburg Fertilizer Co., Spartanburg, S. C.	Tiger Brand 11-1	Saluda	11.00					1.00				11.60
				11.15					1.01				11.80
Brand claiming													
5726	Dixie Guano Co., Suffolk, Va.	Dixie Alkaline Bone and Potash	Edenton	11.00					2.00				13.30
				11.03					2.28				13.80
Brand claiming													
5754	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 12 and 2 Bone and Potash Mixture	Whitakers	12.00					2.00				14.20
				12.08					2.01				14.31
Brand claiming													
5731	Union Guano Co., Winston-Salem, N. C.	Union 12-4 Bone and Potash	Gilbersonville	12.00					4.00				17.60
				11.96					3.88				17.36
Brand claiming													
5947	Baugh & Sons Co., Norfolk, Va.	Baugh's 13-2 Phosphate and Potash	Guilford College	13.00					2.00				15.10
				12.25					2.01				14.49
Brand claiming													
5933	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 14-2	Mocksville	14.00					2.00				16.00
				15.40					2.06				17.36



# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## RAW OR UNMIXED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100						Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Potash from Muriate		Potash from Sulphate
<b>Brand claiming</b>											
5543	Craven Chemical Co., New Bern, N. C.	C. C. C. Acid Phosphate	Burlington	12.00							\$ 9.60
<b>Brand claiming</b>											
5299	American Fertilizing Co., Norfolk, Va.	Eagle Brand Acid Phosphate	Cid	13.00							8.78
<b>Brands claiming</b>											
5836	Armour Fertilizer Works, Greensboro, N. C.	Armour's Star Phosphate Fertilizer	High Point	14.40							10.40
6273	Imperial Co., Norfolk, Va.	Imperial High Grade Acid Phosphate	White Oak	13.66							11.37
5628	Navassa Guano Co., Wilmington, N. C.	Navassa 14 Per Cent Acid Phosphate	Lawndale	15.14							11.20
5857	Norfolk Fertilizing Co., Norfolk, Va.	Oriana Acid Phosphate	Troy	14.16							11.52
5301	Old Buck Guano Co., Richmond, Va.	Old Buck 14 Per Cent Acid Phosphate	Lexington	14.72							10.93
5691	Patapsco Guano Co., Baltimore, Md.	Patapsco Pure Dissolved Phosphate	Baltimore	14.31							12.11
5551	Richmond Guano Co., Richmond, Va.	High Grade Acid Phosphate	Hickory	15.05							11.33
5772	Royster, F. S., Guano Co., Norfolk, Va.	Royster's 14 Per Cent Acid Phosphate	Roaring River	14.00							11.78
5552	Swift & Co., Fertilizer Works, Atlant a, Ga.	Swift's Cultivator High Grade Acid Phosphate	Lenoir	14.32							11.45
5693	Tuscarora Fertilizer Co., Greensboro, N. C.	Tuscarora Acid Phosphate	Craggy	14.23							12.04
5559	Va.-Car. Chemical Co., Richmond, Va.	Davie & Whittle's Owl Brand High Grade Dissolved Bone	Charlotte	15.80							11.20

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. RAW OR UNMINED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100								Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Murate	Potash from Sulphate		Chlorine
Brands claiming													
5901	Va.-Car. Chemical Co., Richmond, Va.	Southern Chemical Co.'s Red Cross Acid Phosphate.	Penrose	14.00									\$11.20
5995	do.	V.-C. C. Co.'s 11 Per Cent Acid Phosphate.	Lenoir	11.72									12.26
Brands claiming													
5974	Adair, A. D., & McCarty Bros., Atlanta, Ga.	Adair's High Grade Dissolved Bone	Spruce Pine	15.91									11.78
6066	American Agricultural Chemical Co., New York, N. Y.	Detrick's 16 Per Cent Acid Phosphate.	Kings Mountain	16.51									12.80
6104	do.	Zell's 16 Per Cent Acid Phosphate.	Asheville	16.15									12.73
5335	do.	do.	Dallas	16.46									13.21
5263	American Fertilizing Co., Norfolk, Va.	American High Grade Acid Phosphate.	Wadesboro	16.43									12.92
5336	Armour Fertilizer Works, Greensboro, N. C.	Armour's 16 Per Cent Acid Phosphate Fertilizer.	Gastonia	16.22									13.17
5936	do.	do.	Rural Hall	17.19									13.14
6081	Ashepoo Fertilizer Works, Charleston, S. C.	Acid Phosphate, 16 Per Cent.	Gibsonville	16.06									12.85
5610	do.	do.	Monroe	15.48									12.38
6287	Asheville Packing Co., Asheville, N. C.	Acid Phosphate.	Asheville	16.43									13.14
5377	do.	Asheville High Grade Phosphate.	Asheville	16.26									13.01
5334	Atlantic Chemical Co., Norfolk, Va.	Atlantic High Grade 16 Per Cent Acid Phosphate.	Kings Mountain	16.32									13.06
5186	Acme Mfg. Co., Wilmington, N. C.	16 Per Cent Acid Phosphate.	Rowland	15.81									12.65
5445	Baugh & Sons Co., Philadelphia, Pa.	Baugh's 16 Per Cent Acid Phosphate	Winston-Salem	16.02									12.82

5755	Beta Fertilizer Co., Beta, N. C.	Beta Special Acid Phosphate.....	Beta.....	16.28	13.02
5881	Boney, P., Goldsboro, N. C.	16 Per Cent Acid Phosphate.....	Lillington.....	14.99	11.99
5856	Brown, H. P., Salisbury, N. C.	Farmers' Union 16 Per Cent Acid Phosphate.....	Swannanoa.....	17.27	13.82
6073	Bryant Fertilizer Co., Wilmington, N. C.	Bryant's Acid Phosphate.....	Porters.....	16.45	13.16
5777	Bryant Fertilizer Co., Alexandria, Va.	Bryant's 16 Per Cent Acid Phosphate.....	Waxhaw.....	15.53	12.42
5391	Caraleigh Phosphate and Fertilizer Wks., Raleigh, N. C.	Caraleigh Acid Phosphate.....	Garner.....	14.36	11.49
5291	Columbia Guano Co., Norfolk, Va.	Columbia High Grade 16 Per Cent Acid Phosphate.....	Hazelwood.....	16.20	12.96
5780	Carolina Union Fertilizer Co., Norfolk, Va.	Carolina Union 16 Per Cent Acid Phosphate.....	Richfield.....	16.35	13.08
5545	Coveta Fertilizer Co., Newnan, Ga.	Coveta 16 Per Cent Acid Phosphate.....	Reidsville.....	16.94	13.55
6220	Conestee Chemical Co., Wilmington, N. C.	16 Per Cent Acid Phosphate.....	Vander.....	17.91	14.33
6219	do.	do.	Fayetteville.....	17.70	14.16
6272	do.	do.	Vander.....	16.19	12.95
5210	do.	do.	Talesville.....	15.95	12.76
5685	Cooperative Warehouse Co., Salisbury, N. C.	Farmers' Union 16 Per Cent Acid Phosphate.....	Louisburg.....	16.08	12.86
5925	Contentnea Guano Co., Wilson, N. C.	High Grade 16 Per Cent Acid Phosphate.....	Kinston.....	16.31	13.05
5847	Cotton States Fertilizer Works, Wilmington, N. C.	Cotton States Acid Phosphate, High Grade.....	Statesville.....	16.48	13.18
5544	Craven Chemical Co., New Bern, N. C.	Panama 16 Per Cent Acid Phosphate.....	Burlington.....	14.87	11.90
5604	Enterprise Guano Co., Baltimore, Md.	Enterprise Acid Phosphate.....	Monroe.....	16.52	13.22
6100	Ediwan Fertilizer Co., Charleston, S. C.	Ediwan 16 Per Cent Acid Phosphate.....	Lexington.....	17.83	14.26
5452	Farmers Guano Co., Raleigh, N. C.	F. G. C. Acid Phosphate.....	Oxford.....	15.40	12.32
5906	Farmville Oil and Fertilizer Co., Farmville, N. C.	XX High Grade Acid Phosphate.....	Farmville.....	16.06	12.85
5986	Fremont Oil Mill Co., Fremont, N. C.	16 Per Cent Acid Phosphate.....	Fremont.....	13.75	11.00
5580	Georgia Chemical Works, Augusta, Ga.	High Grade Dissolved Bone Phosphate.....	Youngsville.....	15.50	12.40
5785	Imperial Co., Norfolk, Va.	Imperial High Grade Tennessee Acid Phosphate.....	Edenton.....	16.45	13.16
6035	Lenoir Oil and Ice Co., Kinston, N. C.	L. O. and I. Co.'s 16 Per Cent Acid Phosphate.....	Ayden.....	16.16	12.93
6054	Lister's Agricultural Chemical Co., Newark, N. J.	Lister's High Grade Acid Phosphate.....	Bonlee.....	15.36	12.29

# ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915. RAW OR UNMINED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100							Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Muriate Potash from		Sulphate Potash from
Brands claiming												
5852	Marietta Fertilizer Co., Greensboro, N. C.	Marietta High Grade Acid Phosphate.	Aquadale	16.00								\$12.80
5957	do.	Marietta XXXX High Grade Acid Phosphate.	Marshville	15.81								12.65
6213	do.	Marietta High Grade Acid Phosphate.	Graham	15.21								12.17
5917	McCoy, William L., Dillard, Ga.	Marietta High Grade Acid Phosphate.	Franklin	14.87								11.90
5778	McNair Phosphate Co., Laurinburg, N. C.	High Grade Acid Phosphate.	Monroe	17.01								13.63
5918	National Fertilizer Co., Nashville, Tenn.	High Grade Acid Phosphate.	Murphy	15.18								12.14
5208	Nayassa Guano Co., Wilmington, N. C.	Nayassa 16 Per Cent Acid Phosphate.	Indian Trail	15.01								12.01
6303	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union 16 Per Cent Acid Phosphate.	Youngsville	17.06								13.65
5848	do.	do.	Statesville	16.76								13.41
5741	do.	do.	Rutherfordton	16.58								13.26
6304	N. C. Farmers' Union, Statesville, N. C.	N. C. Farmers' Union 16 Per Cent Acid Phosphate.	Wake Forest	16.16								13.17
5173	New Bern Cotton Oil and Fertilizer Co., New Bern, N. C.	16 Per Cent Acid Phosphate.	New Bern	16.13								12.90
5589	Nitrate Agencies Co., New York, N. Y.	16 Per Cent Acid Phosphate.	Williamston	16.15								12.92
6158	Norfolk Fertilizer Co., Norfolk, Va.	Oriana 16 Per Cent Acid Phosphate.	Stedman	15.15								12.12
5300	Old Buck Guano Co., Richmond, Va.	Old Buck 16 Per Cent Acid Phosphate.	Lexington	16.78								13.42
5505	Palmetto Guano Co., Columbia, S. C.	Palmetto Acid Phosphate.	Norwood	14.91								11.93
5174	Pamlico Chemical Co., Washington, N. C.	Pamlico 16 Per Cent Acid Phosphate.	Bayboro	16.71								13.37

5692	Patapasco Guano Co., Baltimore, Md.	Florida Soluble Phosphate	Baltimore	15.38	12.30
6144	Pearcell & Co., Wilmington, N. C.	16 Per Cent Acid Phosphate	Red Springs	16.46	13.17
5162	Phillips Fertilizer Co., Washington	Phillips' High Grade 16 Per Cent Acid Phosphate	Washington	15.90	12.72
6292	do.	do.	Washington	15.66	12.53
5831	Poehontas Guano Co., Lynchburg, Va.	Carlington's S. C. Phosphate, Waukesha Brand	Colfax	15.90	12.72
5302	Pocomoke Guano Co., Norfolk, Va.	Superb Acid Phosphate, 16 Per Cent	Denton	16.22	12.98
5325	Powhatan Chemical Co., Richmond, Va.	Magie Dissolved Bone Phosphate	Crouse	16.30	13.04
5801	Rasin-Monumental Co., Baltimore, Md.	Rasini's 16 Per Cent Acid Phosphate	Liberty	16.80	13.44
5387	Richmond Guano Co., Richmond, Va.	Rex Dissolved Bone Phosphate	Moorestville	16.36	13.09
5326	Robertson Fertilizer Co., Norfolk, Va.	High Peak Acid Phosphate	Shelby	17.08	13.66
6332	Royster, F. S., Guano Co., Norfolk, Va.	Royster's High Grade 16 Per Cent Acid Phosphate	Creswell	16.46	13.17
5255	do.	High Grade Acid Phosphate	Waynesville	16.28	13.02
5846	Southern Cotton Oil Co., Davidson, N. C.	Southern Cotton Oil Co.'s 16 Per Cent Acid Phosphate	Davidson	17.11	13.69
5209	Southern Cotton Oil Co., Monroe, N. C.	do.	Indian Trail	16.41	13.13
5900	Spartanburg Fertilizer Co., Spartanburg S. C.	Tiger Brand 16 Per Cent	Horse Shoe	16.46	13.17
5155	Standard Guano Co., Baltimore, Md.	Farmers Supply Co.'s 16 Per Cent Acid Phosphate	Edenton	16.40	13.12
6139	Swift & Co. Fertilizer Works, Atlanta, Ga.	Swift's Special High Grade Acid Phosphate	Lenoir	16.91	13.53
5316	do.	do.	Burgaw	16.44	13.15
6041	Tidewater Guano Co., Norfolk, Va.	Top Rail Acid Phosphate	Hobgood	16.86	13.49
6166	Tuscarora Fertilizer Co., Wilmington, N. C.	Tuscarora Acid Phosphate	Lumber Bridge	16.42	13.11
5207	do.	do.	Concord	16.08	12.86
5513	Union Guano Co., Winston, N. C.	High Grade Dissolved Bone Phosphate, Union 16 Per Cent Acid Phosphate	Newton	16.98	13.58
5292	do.	do.	Biscoe	16.50	13.20
6198	Union Seed and Fertilizer Co., Wilmington, N. C.	High Grade 16 Per Cent Acid Phosphate	Duke	15.80	12.64
5672	Vance Guano Co., Henderson, N. C.	Best Grade Acid Phosphate	Youngsville	16.55	13.24
5376	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Va. Fert. Co.'s Bull Run Acid Phosphate	Topton	17.31	13.85

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## RAW OR UNMINED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100							Relative Value per Ton at Factory
				Available Phosphoric Acid	Water-soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Sulphate	
Brands claiming											
5386	Va.-Car. Chemical Co., Richmond, Va.	Atlantic and Va. Fert. Co.'s Bull Run Acid Phosphate	Statesville	16.00							\$12.80
5694	do.	Atlantic and Virginia Fert. Co.'s Eureka Acid Phosphate	Craggy	16.87							13.50
5385	do.	Davis & Whittle's Owl Brand High Grade Acid Phosphate	Mooreville	17.66							14.13
5443	do.	Durham Fertilizer Co.'s Best Acid Phosphate	Mocksville	17.08							14.11
5280	do.	Southern Chemical Co.'s Comet 16 Per Cent Acid Phosphate	No. Wilkesboro	16.89							13.51
5663	do.	S. W. Travers' Champion Acid Phosphate	Hornby	17.58							11.06
5201	do.	V.-C. C. Co.'s 16 Per Cent Acid Phosphate	Goldsboro	17.31							13.85
6113	do.	do.	Red Springs	15.98							12.78
5550	do.	Va. State Fertilizer Co.'s Bull Run Acid Phosphate	Elmwood	15.55							12.44
				15.80							12.64
Brand claiming								48.00			76.80
5588	Nitrate Agencies Co., New York, N. Y.	Muriate of Potash	Williamston					51.00			81.60
Brands claiming											56.82
5934	Armour Fertilizer Works, Greensboro, N. C.	Nitrate of Soda	Rural Hall						14.81	18.00	
6240	do.	do.	Cameron						15.41	18.77	58.67
6289	do.	do.	White Oak						15.12	18.38	57.46
6034	Ashepool Fertilizer Co., Charleston, S. C.	do.	Elm City						15.00	18.24	57.00
6076	Baker, H. J., & Bro., New York, N. Y.	do.	Kinston						15.16	18.43	57.61
									15.24	18.53	57.91

5716	Cooper Guano Co., Wilmington, N. C.	do	15.40	18.72	58.52
5609	Grace, W. R., & Co., New York, N. Y.	do	15.68	19.06	59.58
5992	Meadows, E. H. & J. A., Co., New Bern, N. C.	do	15.40	18.72	58.52
5630	Powhatan Chemical Co., Richmond, Va.	do	15.68	19.06	59.58
6252	Robertson Fertilizer Co., Norfolk, Va.	do	15.40	18.78	58.52
6246	Tuscarora Fertilizer Co., Greensboro, N. C.	do	15.24	18.53	57.91
6199	Union Seed and Fertilizer Co., Wilmington, N. C.	do	15.12	18.38	57.46
6241	Va.-Car. Chemical Co., Richmond, Va.	do	14.92	18.14	56.70
<b>Brand claiming</b>					
			14.88	18.20	56.54
5924	Craven Chemical Co., New Bern, N. C.	Nitrate of Soda	15.40	18.70	58.52
<b>Brands claiming</b>					
			15.00	18.23	57.00
6033	Berkley Chemical Co., Norfolk, Va.	Nitrate of Soda	15.36	18.67	58.37
6200	Coe-Mortimer Co., Charleston, S. C.	do	15.16	18.43	57.61
6181	Imperial Co., Norfolk, Va.	do	15.84	19.26	60.19
5766	Josey, N. B., Guano Co., Tarboro, N. C.	do	15.16	18.43	57.61
5490	Nitrate Agencies Co., Norfolk, Va.	do	15.48	18.82	58.82
5779	Palmetto Guano Co., Columbia, S. C.	do	15.36	18.67	58.37
<b>Brands claiming</b>					
			15.22	18.50	57.84
5512	Old Buck Guano Co., Richmond, Va.	Nitrate of Soda	15.36	18.67	58.37
6046	Royster, F. S., Guano Co., Norfolk, Va.	do	15.48	18.82	58.82
<b>Brands claiming</b>					
			15.67	19.00	59.55
5993	New Bern Cotton Oil and Fertilizer Co., New Bern, N. C.	Nitrate of Soda	15.24	18.53	57.92
<b>Brands claiming</b>					
			18.00*		14.40
6274	Coe-Mortimer Co., Charleston, S. C.	Thomas Phosphate	17.90*		14.32
5444	Cooperative Warehouse Co., Salisbury, N. C.	do	17.47*		13.98

## ANALYSES OF COMMERCIAL FERTILIZERS—SPRING SEASON, 1915.

## RAW OR UNMINED FERTILIZER MATERIALS.

Laboratory Number	Name and Address of Manufacturer	Name of Brand	Where Sampled	Percentage Composition or Parts per 100										Relative Value per Ton at Factory	
				Available Phosphoric Acid	Water- soluble Nitrogen	Organic Nitrogen	Total Nitrogen	Equivalent to Ammonia	Total Potash	Potash from Murate	Potash from Sulphate	Chlorine			
<b>Brand claiming</b>															
5845	Federal Chemical Co., Louisville, Ky....	Tennessee Phosphate	Cornelius.....	29.75*											\$23.80
<b>Brand claiming</b>															
6242	Central Phosphate Co., Mount Pleasant, Tenn.	Tennessee Phosphate	Greensboro.....	28.00*											23.00
				28.00*											22.40
				26.85*											21.48

\*Total Phosphoric Acid in Thomas Phosphate valued at 4 cents per pound.



## II. ANALYSES COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent Nitrogen Guaranteed	Equivalent to	Ammonia	Per Cent Nitrogen Found	Equivalent to	Ammonia
5399	Atlanta Cotton Oil Co., Atlanta, Ga.....	Murphy.....	6.17	7.50	<b>6.02</b>	<b>7.32</b>		
5406	Broadway Cotton Oil Co., Belton, S. C.....	Tryon.....	6.17	7.50	6.66	8.10		
5331	.....do.....	Hendersonville.....	6.17	7.50	6.38	7.76		
5310	Buckeye Cotton Oil Co., Charlotte, N. C.....	Murphy.....	6.17	7.50	6.40	7.78		
5384	.....do.....	Morven.....	6.17	7.50	<b>6.16</b>	<b>7.49</b>		
5422	.....do.....	Wadesboro.....	6.17	7.50	<b>6.04</b>	<b>7.34</b>		
5424	.....do.....	Rural Hall.....	6.17	7.50	<b>5.06</b>	<b>6.15</b>		
5314	.....do..... Cincinnati, Ohio.....	Mooreville.....	6.17	7.50	<b>5.41</b>	<b>6.58</b>		
5388	.....do.....	Balsam.....	6.17	7.50	6.20	7.54		
5374	Chatham Oil and Fertilizer Co., Pittsboro, N. C.....	Wadesboro.....	6.17	7.50	6.22	7.56		
5393	.....do.....	New Hill.....	6.17	7.50	<b>6.00</b>	<b>7.29</b>		
5341	.....do.....	Pittsboro.....	6.17	7.50	<b>5.38</b>	<b>6.54</b>		
5332	Chesnee Oil Mill, Chesnee, S. C.....	Asheville.....	6.17	7.50	<b>5.78</b>	<b>7.03</b>		
4431	.....do.....	Spruce Pine.....	6.17	7.50	6.32	7.68		
5346	Chowan Cotton Oil and Fertilizer Co., Edenton, N. C.....	Edenton.....	6.17	7.50	<b>5.33</b>	<b>6.48</b>		
5322	Clayton Oil Mill Co., Clayton, N. C.....	Clayton.....	6.17	7.50	6.60	8.02		
5412	Cleveland Oil and Fertilizer Co., Cleveland, N. C.....	Cleveland.....	6.17	7.50	6.62	8.05		
5438	.....do.....	Salisbury.....	6.17	7.50	<b>6.10</b>	<b>7.42</b>		
5329	Clinton Oil Mfg. Co., Clinton, N. C.....	Pisgah Forest.....	6.17	7.50	6.20	7.54		
5342	Clover Cotton Oil and Ginning Co., Clover, S. C.....	Lincolnton.....	6.17	7.50	6.40	7.78		
5391	Campobello Oil Mill, Campobello, S. C.....	Waynesville.....	6.17	7.50	6.24	7.59		
5334	.....do.....	Tryon.....	6.17	7.50	<b>5.74</b>	<b>6.98</b>		
5409	Consumers Cotton Oil Co., Tarboro, N. C.....	Williamston.....	6.17	7.50	6.44	7.83		
5411	Dunn Oil Mill Co., Dunn, N. C.....	Kenly.....	6.17	7.50	6.54	7.95		
5325	.....do.....	Dunn.....	6.17	7.50	6.22	7.56		
5365	Eastern Cotton Oil Co., Hertford, N. C.....	Jamesville.....	6.17	7.50	<b>5.80</b>	<b>7.05</b>		
5379	Elba Mfg. Co., Charlotte, N. C.....	Greensboro.....	6.17	7.50	6.40	7.78		
5390	.....do.....	Hazelwood.....	6.17	7.50	6.34	7.71		
5383	.....do.....	Monroe.....	6.17	7.50	6.32	7.68		
5417	.....do..... Maxton, N. C.....	Roaring River.....	6.17	7.50	6.68	8.12		
5315	.....do.....	Kings Mountain.....	6.17	7.50	<b>5.94</b>	<b>7.22</b>		
5408	Elizabeth Oil and Fertilizer Co., Elizabeth City, N. C.....	Elizabeth City.....	6.17	7.50	6.78	8.24		
5348	.....do.....	Elizabeth City.....	6.17	7.50	6.62	8.05		
5321	Farmers Cotton Oil Co., Wilson, N. C.....	Wilson.....	6.17	7.50	6.34	7.71		
5418	.....do.....	Enfield.....	6.17	7.50	6.28	7.64		
5326	Farmers Oil Mill Co., Nashville, N. C.....	Nashville.....	6.17	7.50	6.64	8.07		
5323	Farmville Oil and Fertilizer Co., Farmville, N. C.....	Farmville.....	6.17	7.50	6.18	7.51		

## II. ANALYSES COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent	Guaranteed	Equivalent	Ammonia	Per Cent	Found	Equivalent	Ammonia
			Nitrogen	Nitrogen	to	to	Nitrogen	Nitrogen	to	to
5435	Georgia Cotton Oil Co., Macon, Ga.....	Andrews.....	6.17	7.50	6.42	7.81				
5396	.....do.....	Topton.....	6.17	7.50	5.42	6.59				
5429	Greer Cotton Oil Co., Greer, S. C.....	Penrose.....	6.17	7.50	6.60	8.02				
5415	Hampton Cotton Mills, Edgefield, S. C.....	Asheville.....	6.17	7.50	6.52	7.93				
5413	Harper Cotton Oil Co., East Point, Ga.....	Hendersonville....	6.17	7.50	6.76	8.22				
5349	Havens Oil Co., Washington, N. C.....	Washington.....	6.17	7.50	6.74	8.19				
5370	.....do.....	Washington.....	6.17	7.50	6.20	7.54				
5343	Highland Park Mfg. Co., Rock Hill, S. C.....	Pineville.....	6.17	7.50	6.72	8.17				
5400	Honea Path Oil Mills, Honea Path, S. C.....	Bushnell.....	6.17	7.50	6.42	7.81				
5344	Imperial Cotton Oil Co., Statesville, N. C.....	Statesville.....	6.17	7.50	7.04	8.56				
5425	.....do.....	Statesville.....	6.17	7.50	5.84	7.10				
5317	Kershaw Oil Mill, Kershaw, S. C.....	Asheville.....	6.17	7.50	6.18	7.51				
5389	.....do.....	Balsam.....	6.17	7.50	6.16	7.49				
5375	.....do.....	Walnut Cove.....	6.17	7.50	5.98	7.27				
5381	Lancaster Cotton Oil Co., Lancaster, S. C.....	No. Wilkesboro....	6.17	7.50	5.90	7.17				
5433	.....do.....	Saluda.....	6.17	7.50	5.82	7.08				
5395	Lee County Cotton Oil Co., Sanford, N. C.....	Sanford.....	6.17	7.50	6.22	7.56				
5121	.....do.....	Siler City.....	6.17	7.50	6.04	7.34				
5414	Louisburg Cotton Oil Co., Louisburg, N. C.....	Asheville.....	6.17	7.50	6.30	7.66				
5428	.....do.....	Rosman.....	6.17	7.50	6.14	7.47				
5347	Marion Cotton Oil Co., Marion, N. C.....	Whiteville.....	6.17	7.50	6.38	7.76				
5337	Marion Harper Cotton Oil Co., East Point, Ga....	Bryson City.....	6.15	7.50	6.20	7.54				
5367	Mount Olive Cotton Oil Co., Mount Gilead, N. C..	West End.....	6.15	7.50	7.16	8.71				
5376	Mount Gilead Cotton Oil Co., Mount Gilead, N. C.	Winston-Salem....	6.17	7.50	6.40	7.78				
5350	New Bern Cotton Oil and Fertilizer Mills, New Bern, N. C.	New Bern.....	6.17	7.50	6.28	7.64				
5371	.....do.....	New Bern.....	6.17	7.50	6.52	7.93				
5432	Newton Oil and Fertilizer Co., Newton, N. C.....	Newton.....	6.17	7.50	6.02	7.32				
5430	Raleigh Cotton Oil Co., Raleigh, N. C.....	Gulf.....	6.17	7.50	6.52	7.93				
5403	.....do.....	Garner.....	6.17	7.50	6.26	7.61				
5426	.....do.....	Kinston.....	6.17	7.50	6.16	7.49				
5386	Robeson Mfg. Co., Lumberton, N. C.....	Lumberton.....	6.17	7.50	6.42	7.81				
5405	Southern Cotton Oil Co., Charlotte, N. C.....	Winston-Salem....	6.17	7.50	6.26	7.61				
5368	.....do.....	Rockingham.....	6.17	7.50	6.22	7.56				
5385	.....do.....	McFarland.....	6.17	7.50	6.14	7.47				
5316	.....do.....	Swannanoa.....	6.17	7.50	5.92	7.20				
5338	.....do..... Davidson, N. C.....	Murphy.....	6.17	7.50	6.28	7.64				
5372	.....do.....	Davidson.....	6.17	7.50	6.20	7.54				

## II. ANALYSES COTTON SEED MEAL.

Laboratory Number	Name and Address of Manufacturer	Where Sampled	Per Cent	to	Per Cent	to
			Nitrogen Guaranteed	Ammonia Equivalent	Nitrogen Found	Ammonia Equivalent
5437	Southern Cotton Oil Co., Decatur, Ala.....	Asheville.....	6.17	7.50	6.34	7.71
5380	.....do.....Fayetteville, N. C.....	Greensboro.....	6.17	7.50	6.34	7.71
5328	.....do.....	Fayetteville.....	6.17	7.50	5.98	7.27
5419	.....do.....Gastonia, N. C.....	Long Shoals.....	6.17	7.50	6.20	7.54
5369	.....do.....Gibson, N. C.....	Gibson.....	6.17	7.50	5.92	7.20
5404	.....do.....Goldsboro, N. C.....	Snow Hill.....	6.17	7.50	6.22	7.56
5324	.....do.....	Goldsboro.....	6.17	7.50	5.76	7.00
5397	.....do.....Macon, Ga.....	Andrews.....	6.17	7.50	6.26	7.61
5382	.....do.....Monroe, N. C.....	Monroe.....	6.17	7.50	6.04	7.34
5320	.....do.....Selma, N. C.....	Smithfield.....	6.17	7.50	5.43	6.60
5335	.....do.....Shelby, N. C.....	Saluda.....	6.17	7.50	5.94	7.22
5420	.....do.....	Lawndale.....	6.17	7.50	5.94	7.22
5392	.....do.....Spartanburg, S. C.....	Waynesville.....	6.17	7.50	5.94	7.22
5398	.....do.....	Bushnell.....	6.17	7.50	6.60	8.02
5318	.....do.....	Asheville.....	6.17	7.50	5.58	6.78
5330	.....do.....Union, S. C.....	Hendersonville.....	6.17	7.50	6.64	8.07
5436	Swift & Co. Fertilizer Works, Atlanta, Ga.....	Bryson City.....	6.17	7.50	6.34	7.71
5336	Taylor Commission Co., Atlanta, Ga.....	Sylva.....	6.17	7.50	6.74	6.98
5339	Tiger Shoal Milling Co., Wellford, S. C.....	Waynesville.....	6.17	7.50	6.36	7.73
5434	Union Seed and Fertilizer Co., Atlanta, Ga.....	Whitney.....	6.17	7.50	6.16	7.49
5387	.....do.....Charlotte, N. C.....	Bryson City.....	6.17	7.50	6.20	7.54
5345	.....do.....	Pineville.....	6.17	7.50	6.08	7.39
5377	.....do.....	Mocksville.....	6.17	7.50	5.76	7.00
5373	.....do.....	Lincolnton.....	6.17	7.50	5.66	6.88
5394	Union Seed and Fertilizer Co., Raleigh, N. C.....	Apex.....	6.17	7.50	6.28	7.64
5416	.....do.....	Waynesville.....	6.17	7.50	6.28	7.64
5378	.....do.....	Burlington.....	6.17	7.50	6.02	7.32
5366	Union Seed and Fertilizer Co., Wilmington, N. C.....	Vineland.....	6.17	7.50	6.12	7.44
5423	Va.-Car. Chemical Co., Richmond, Va.....	Princeton.....	6.17	7.50	6.38	7.76
5407	Welmont Oil Co., Pelzer, S. C.....	Tryon.....	6.17	7.50	6.24	7.59
5333	.....do.....	Tryon.....	6.17	7.50	5.80	7.05
5319	Winterville Cotton Oil Co., Winterville, N. C.....	Greenville.....	6.17	7.50	5.90	7.17
5427	Yorkville Cotton Oil Co., Yorkville, S. C.....	Wayneville.....	6.17	7.50	6.82	8.29
5327	Zebulon Cotton Oil Co., Zebulon, N. C.....	Zebulon.....	6.17	7.50	6.92	8.41
5410	.....do.....	Middlesex.....	6.17	7.50	6.82	8.29



## LEAF TOBACCO REPORT FOR SEPTEMBER, 1915.

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Pounds sold for producers.....	32,789,984
Pounds sold for dealers.....	3,492,542
Pounds sold for warehouses.....	1,913,204
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Total .....	38,195,730



**THE BULLETIN**

OF THE

**NORTH CAROLINA**

**DEPARTMENT OF AGRICULTURE**

**RALEIGH**

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Vol. 36, No. 12

DECEMBER, 1915

Whole No. 215

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**SIXTEENTH ANNUAL REPORT**

ON

**FOOD ADULTERATION**

**UNDER THE PURE FOOD LAW**

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PUBLISHED MONTHLY AND SENT FREE TO CITIZENS ON APPLICATION.

Entered at the Postoffice at Raleigh, N. C., as second class matter,  
February 7, 1901, under Act of June 6, 1900.

EDWARDS & BROUGHTON PRINTING CO., RALEIGH, N. C.

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E. W. THORNTON.....	Assistant Chemist, Division Food and Oil Inspection.
C. E. BELL.....	Assistant Chemist, Division Food and Oil Inspection.
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C. B. WILLIAMS.....	Agronomist.
J. K. PLUMMER.....	Soil Chemist.
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R. Y. WINTERS.....	Plant Breeding.
*W. E. HEARN.....	State Soil Agent, Soil Survey.
L. L. BRINKLEY.....	Soil Survey.
H. D. LAMBERT.....	Soil Survey.
J. L. BURGESS.....	Agronomist and Botanist.
C. H. WALDRON.....	Assistant Agronomist and Botanist.
MISS LOUISE A. RADEMACHER.....	Assistant to Botanist.
MISS ALMA I. STONE.....	Assistant to Botanist.
DAN T. GRAY.....	Chief in Animal Industry.
R. S. CURTIS.....	Associate in Animal Industry.
W. H. EATON.....	Dairy Experimenter.
†ALVIN J. REED.....	Dairy Farming.
STANLEY COMBES.....	Assistant in Dairy Farming.
†J. A. AREY.....	Assistant in Dairy Farming.
F. T. PEDEN.....	Beef Cattle.
†A. L. JERDAN.....	Beef Cattle.
†J. D. McVEAN.....	Pig Clubs.
EARL HOSTETLER.....	Assistant in Beef Cattle and Swine.
†A. G. OLIVER.....	Poultry Clubs.
†E. H. MATHEWSON.....	Tobacco Investigations.
†C. R. HUDSON.....	Farm Demonstration Work.
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†A. K. ROBERTSON.....	Assistant in Boys' Clubs.
†MRS. JANE S. MCKIMMON.....	Assistant in Charge Girls' Clubs.
MISS M. L. JAMISON.....	Assistant in Home Economics.

C. E. CLARK, Assistant Director Edgecombe Test Farm, Rocky Mount, N. C.

F. T. MEACHAM, Assistant Director Iredell Test Farm, Statesville, N. C.

JOHN H. JEFFERIES, Assistant Director Pender Test Farm, Willard, N. C.

S. O. PERKINS, Assistant Director Transylvania and Buncombe Test Farms, Swannanoa, N. C.

E. G. MOSS, Assistant Director Cranville Test Farm, Oxford, N. C.

\*Assigned by the Bureau of Soils, United States Department of Agriculture.

†Assigned by the Bureau of Animal Husbandry, United States Department of Agriculture.

‡In coöperation with Bureau of Plant Industry, United States Department of Agriculture.



## LETTER OF TRANSMITTAL

November 1, 1915.

HON. W. A. GRAHAM,  
*Commissioner of Agriculture,*  
*Raleigh, N. C.*

SIR:—I submit herewith manuscript covering the investigations that have been made during the past year under the State Food Law, Chapter 368, Laws of 1907. I recommend its publication as the December BULLETIN and Sixteenth Annual Food Report.

Respectfully submitted,

W. M. ALLEN,  
*State Food and Oil Chemist.*

Approved:  
W. A. GRAHAM,  
*Commissioner of Agriculture.*



# REPORT ON FOOD ADULTERATION FOR 1915

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By W. M. ALLEN, STATE FOOD AND OIL CHEMIST,

ASSISTED BY

E. W. THORNTON, ASSISTANT CHEMIST,

C. E. BELL, ASSISTANT CHEMIST.

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Report on Food Adulteration and the Enforcement of Food Law for 1915—the sixteenth annual report on the subject.

## THE ENFORCEMENT OF THE LAW

The State Food Law, chapter 368, Public Laws of North Carolina, 1907, makes it the duty of the State Department of Agriculture to enforce the food law. The law provides that the Board of Agriculture shall adopt and publish standards of strength and purity for food products and regulations for the enforcement of the law. Such standards and regulations have been adopted and published in the Annual Food Reports from time to time, as well as in pamphlet form, and have been sent to the dealers of the State, and will be sent on application to any citizen of the State.

## NET WEIGHT OR MEASURE

The Legislature of 1915 amended the State Food Law so that it requires the net weight or measure to be stated on the label of foods in package form. The law now reads as follows:

That for the purpose of this act an article shall also be deemed to misbranded:

If in package form, the quantity of the contents be not plainly and conspicuously marked on the outside of the package in terms of weight, measure, or numerical count so as to comply with the regulations on labeling prescribed by the Board of Agriculture, provided for by section ten, chapter three hundred and sixty-eight of the Public Laws of nineteen hundred and seven, the Board of Agriculture is hereby authorized to establish rules and regulations permitting reasonable variations when in their judgment exactness is impracticable: *Provided*, that the provisions of this paragraph shall not apply to articles in packages or containers when the retail price of such article is six cents or less: *And provided further*, that it shall not apply to products on hand at the time of the passage of this act until after January first, nineteen hundred and sixteen.

## ATTENTION OF LOCAL DEALERS

The Department has spent a great deal of time and money trying to show and inform the dealers of the State how to comply with the law, and yet many of them continue to sell at retail from bulk compounds and imitation products as straight food products.

The attention of local dealers is especially called to the sale of compounds and imitations as straight food products. The sale of a compound or imitation food product is legal, provided it contains nothing deleterious to health and is sold under its own name as a compound or imitation, as the case may be. But the sale of a compound vinegar or of an imitation or spirit vinegar as vinegar is a violation of the law.

The sale of butterine or renovated butter as butter is a violation of the law.

The sale of a compound coffee and chicory as coffee is a violation of the law.

The sale of a compound sirup or a mixture of glucose or corn sirup and refiners' sirup as sirup is a violation of the law.

The sale of filled cheese, or skim-milk cheese, or cheese below standard in milk fat as cheese is a violation of the law.

The sale of compound ice-cream or an ice-cream below standard in butter fat as ice-cream, without making in the fact known to the purchaser, is a violation of the law.

The sale of canned vegetables colored with copper sulphate is a violation of the law.

The attention of dealers is again especially called to the definitions and standards for the above products, reported elsewhere in this BULLETIN.

## STANDARDS AND REGULATIONS

### NOTES ON

The Food Law provides that the Board of Agriculture shall adopt and publish standards of strength and purity and regulations for the enforcement of the law, and that these standards when adopted and published shall become the standards before all courts of the State.

These standards and regulations have been adopted and published in the Food Report from time to time, as well as otherwise in pamphlet form, copies of which will be sent on application. The standards adopted by the Board have been carefully worked out by food experts and government officials and have been adopted by the Federal Government and most of the States that are enforcing food laws.

The Law provides that food products shall be deemed to be adulterated if they do not equal in strength and purity the standards adopted by the Board of Agriculture.

## WORK FOR THE YEAR 1915

During the year, 1292 samples of foods and beverages have been analyzed.

## FOOD PRODUCTS EXAMINED.

Name of Samples	Number of Samples
Beers, imitation and near-beers.....	23
Butter, renovated butter and butterine.....	14
Cheese and skim milk cheese.....	7
Cider and imitation ciders.....	28
Cinnamon extracts.....	7
Coffee and coffee substitutes.....	44
Flours.....	518
Honey and substitutes for honey.....	11
Ice cream and ice cream substitutes.....	81
Lard and compound lards.....	15
Lemon extracts and lemon extract substitutes.....	43
Maple sirups and compound maple sirups.....	8
Milk and cream.....	6
Miscellaneous samples.....	7
Molasses and sirups and compounds of same.....	174
Olive and other table and cooking oils.....	6
Orange extracts.....	6
Peppermint extracts.....	5
Rice.....	15
Sweet oil and sweet oil substitutes.....	26
Vanilla extracts and vanilla extract substitutes.....	34
Vinegar and vinegar substitutes.....	214
Total.....	1,292

## BEERS, IMITATION, AND NEAR-BEERS

## DEFINITIONS AND STANDARDS

Malt liquor is a beverage made by the alcoholic fermentation of an infusion, in potable water, of barley malt and hops, with or without unmalted grains.

Beer is a malt liquor produced by bottom fermentation, and contains not less than 5.00 per cent of extractive matter and 0.16 per cent of ash, chiefly potassium phosphate, and not less than 2.75 per cent of alcohol by volume.

## RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler
1501	Beer, Imitation, Mexo.....	Cooperative Fruit Juice Corporation, Norfolk, Va.....
1507	Beverage, "He-No".....	do.....
1498	Beer Imitation, Mexo.....	do.....
1435	Beer Imitation, Pablo.....	Pabst Brewing Co., Milwaukee, Wis.....
15018	Beer Imitation, Barlo.....	The Wurzburg Ginger Ale Co., Portsmouth, Va.....
1474	Beer Imitation, Brown Ribbon.....	Pilgrim Temperance Beverage Works, Chicago, Ill.....
15075	Beer Imitation, Tally.....	Am. J. Lemp Brewing Co., St. Louis, Mo.....
15071	Beer Imitation, Veribest Brew.....	Atlanta Brewing & Ice Co., Atlanta, Ga.....
1518	Beer Imitation, Rei's Special.....	The Purity Extract and Tonic Co., Chattanooga, Tenn.....
14698	Beer Imitation, Poinsetta.....	do.....
12798	.....	.....
1412	Beer Imitation, Rei's Special.....	The Purity Extract and Tonic Co., Chattanooga, Tenn.....
11353	Hop Ale.....	.....
14351	do.....	.....
14594	Near Beer, Eaglo.....	Southern Bottling Co., Baltimore, Md.....
15377	Beer Imitation, Rei's Special.....	The Purity Extract and Tonic Co., Chattanooga, Tenn.....
15394	Near Beer, Victory.....	.....
15110	Near Beer, Diehl's "New-Bru".....	Diehl & Lard, Nashville, Tenn.....
14757	Beer Imitation, Golden Ribbon.....	Golden Ribbon Beverage Association, Council Bluffs, Ia.....
15468	Hop Ale.....	.....
15169	.....	.....
14581	Near Beer, Eaglo.....	Southern Bottling Co., Baltimore, Md.....
14618	Beer Imitation, No Tax.....	Robert Porter Brewing Co., Alexandria, Va.....

## BUTTER AND BUTTER SUBSTITUTES

## DEFINITIONS AND STANDARDS

Butter is the clean, nonrancid product made by gathering in any manner the fat of fresh or ripened milk or cream into a mass, which also contains a small portion of the other milk constituents, with or without salt, and contains not less than 82.50 per cent of milk fat and not more than 16 per cent of water.

The samples, the results of the examination of which are published in table below, were sent to the Department for analysis by county and city officials whose duty it is to enforce the prohibition law. This Department has no authority or funds for work under the latter law, and only determines the alcohol in samples for the above officials to assist them in the performance of their duties.

The presence of alcohol in these products is not objectionable under the food law, and, therefore, no official samples were examined.

As the samples examined were not official under the Food Law, they were only tested for alcohol, as requested by the officials who sent them to the Department.

#### BEERS, IMITATION AND NEAR-BEERS.

Laboratory Number	Retail Dealer or Party Who Sent Sample for Analysis	Alcohol, Per Cent (by Volume)	Remarks and Conclusions
15019	B. W. Bateman, Creswell.....	None	Imitation beer.
15073	Frank Branch, Mayor, Enfield.....	0.09	Beverage.
14985	B. F. Bray, Sheriff, Hertford.....	0.10	Imitation beer.
14354	W. E. Davenport, Hamilton.....	0.22	do.
15018	R. L. Davis, Raleigh.....	0.38	do.
14749	B. F. Dixon, Raleigh.....	0.42	do.
15074	Albion Dunn, Greenville.....	None	do.
15071	G. L. Jones, Franklin.....	0.32	do.
15182	L. L. Kittrell, Mayor, Ayden.....	0.50	do.
14698	C. M. Lomine, Police, Asheville.....	None	do.
12798	W. J. May, Mayor, Spring Hope.....	2.9	Beer.
14423	L. M. McCormack, Asheville.....	0.35	Imitation beer.
14353	E. A. McGhee, High Point.....	0.32	Imitation beer, sale illegal; violation near-beer law.
14351	do.....	0.38	do.
14594	M. C. Medlin, Zebulon.....	2.30	Near-beer.
15377	J. E. Swain, Solicitor, Asheville.....	0.47	do.
15394	C. H. Surratt, Denton.....	2.04	do.
15110	John T. Talton, Mayor, Clayton.....	0.34	Imitation beer.
14757	M. M. Wells, Mayor, Maury.....	0.10	do.
15468	John E. Weyher, Kinston.....	0.22	Imitation beer; sale illegal; violation near-beer law.
15469	do.....	0.18	do.
14581	L. M. White, Roseboro.....	2.2	Near beer.
14618	H. F. Zuglor, Madison.....	0.20	Imitation beer.

Renovated butter, process butter, is the product made by melting butter and working, without the addition or use of chemicals or any substance except milk, cream, or salt, and contains at least 82.50 per cent of milk fat and not more than 16 per cent of water.

#### DEPARTMENT REGULATION 9

##### *Renovated Butter*

The wrapper or wrappers, whether paper or cloth, of all packages, prints, bricks, or rolls of renovated butter, when delivered to customers, must have

the words "Renovated Butter" or "Process Butter" plainly marked, branded, stenciled, or printed thereon in dark-colored letters on light ground so as to be on the outside of the package.

Oleomargarine, olea or butterine, is a substitute for butter, made from other and cheaper fats than butter.

## DEPARTMENT REGULATION 10

*Oleomargarine*

The wrapper or wrappers, whether paper or cloth, of all packages, prints, bricks, or rolls of oleomargarine, when delivered to customers, must have the word "Oleomargarine" or "Butterine" plainly marked, branded, stenciled, or printed thereon in dark-colored letters on light ground so as to be on the outside of the package.

It seems to be quite a custom among the retail dealers of the State to buy process or renovated butter, plainly labeled process butter, and to sell it at retail from the original package as butter.

## RESULTS OF THE EXAMINATION OF BUT

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14674	Butter, Blue Valley.	Butter.....	Blue Valley Creamery Co.....	Cuthrell & Sons, Rocky Mount.
14733	.....	.....	.....	*Geo. F. Catlett, Wilmington.
14673	.....	Butter, renovated	Christian & Munn, Richmond, Va.	H. C. Joyner, Rocky Mount.
15143	.....	.....	.....	*Powell Grocery Co., Goldsboro.
14765	.....	.....	.....	*Standard Store Co., Aberdeen.
14766	.....	.....	.....	.....do.....
15750	.....	Butter.....	.....	*Theim & Birdsong, Raleigh
14428	.....	.....do.....	Arthur Williams, Winston-Salem, N. C.	.....
14426	.....	.....do.....	.....do.....	J. S. Brown, Winston-Salem.
14510	.....	.....do.....	.....do.....	W. T. Brown, Winston-Salem.
14425	.....	.....do.....	.....do.....	.....do.....
14427	.....	.....do.....	.....do.....	J. M. Brown, Winston-Salem.
14511	.....	.....do.....	.....do.....	.....do.....
14512	.....	.....do.....	.....do.....	J. M. Perry, Winston-Salem.

\*Represented to be butter. Samples sent to the Department for analysis.



The United States Department of Agriculture has amended Regulation 21, governing the labeling of renovated butter, to read as follows:

All coverings or wrappers of prints, bricks, or rolls of renovated butter, whether paper or cloth, must have the words "Renovated Butter" in one or two lines, marked, branded, stenciled, or printed thereon in black or nearly black upon white or light ground, in full-faced gothic letters not less than three-eighths of an inch square, so placed as to be the only marking upon one side or surface of the parcel so packed.

If a packer or shipper of renovated or process butter should label his packages renovated or process butter, the retail dealer, in selling same to his customers, should inform them that it is process or renovated butter. So Regulation 9 on renovated butter was passed by the Board of Agriculture, and the attention of retail dealers is called to it and they are urged to comply with the regulation, for it will be enforced.

#### TER AND SUBSTITUTES FOR BUTTER.

Laboratory Number	Moisture, Per Cent	Reading Refractometer, at 40° C.	Refractive Index	Reichert Number	Foam Test	Remarks and Conclusions
14674	12.73	42.5	1.4542	-----	Indicates butter	Butter.
14733	-----	43.0	1.4545	-----	do	Butter which appears to contain a rather large amount of water.
14673	10.17	43.5	1.4548	-----	do	Renovated butter.
15143	-----	43.5	1.4548	-----	do	Butter.
14765	-----	43.5	1.4548	-----	do	do.
14766	-----	43.2	1.4547	-----	do	do.
15750	-----	43.0	1.4545	-----	do	do.
14428	-----	54.9	1.4625	1.44	Indicates Oleo-margarine.	Contains fat other than butter fat. Adulterated. Sale was illegal.
14426	-----	50.0	1.4593	2.66	do	do.
14510	-----	50.0	1.4593	2.46	do	do.
14425	-----	50.0	1.4593	2.67	do	do.
14427	-----	50.0	1.4593	2.15	do	do.
14511	-----	50.0	1.4593	2.50	do	do.
14512	-----	50.0	1.4593	2.58	do	do.

## CHEESE

## DEFINITION AND STANDARDS

Cheese is the sound, solid, and ripened product made from milk and cream by coagulating the casein thereof with rennet or lactic acid, with or without the addition of ripening ferments and seasoning, and contains, in the water-free substance, not less than 50 per cent of milk fat.

Skim-milk cheese or part skim-milk cheese is the sound, solid, and ripened product made from skim-milk or part skim-milk.

A product of this kind containing less than 50 per cent of milk fat in the water-free substance must be sold as skim-milk cheese or as part skim-milk cheese, as the case may be, or under some name that will indicate to the purchaser that it is not a standard cheese.

## RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Sold by Dealer as —	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14676	Cheese.....	Cheese.....	Armour & Co., Richmond, Va.	J. H. Baker, Wake Forest.
14672	do.....	do.....	do.....	T. A. Cooper, Rocky Mount.
14671	do.....	do.....	H. L. Belote, Norfolk, Va.	T. L. Wansley, Rocky Mount
14670	Cheese.....	do.....	Christian & Munn, Richmond, Va.	H. C. Joyner, Rocky Mount.
14675	do.....	do.....	P. A. Reavis Co., Loui-burg, N. C.	J. W. Perry, Loui-burg.
14669	do.....	do.....		J. D. Williams, Wilson.
15471	do.....	do.....	Cuddy Cheese Co., Sheboygan, Wis.	Salem Supply Co., Winston-Salem.

## CIDER AND IMITATION CIDERS

## DEFINITION AND STANDARDS

Cider is a product made by the normal alcoholic fermentation of apple juice, and the usual cellar treatment, and contains not more than 7 per cent of alcohol by volume, not less than 2 per cent and not more than 12 per cent of solids, not more than 8 per cent of reducing sugars, and not less than 0.2 per cent nor more than 0.4 per cent of cider ash.

Cider, to comply with the North Carolina Food Law, must be made entirely of unadulterated apple juice. A product made from the juice of any other fruit than apples, if offered for sale, must bear the name of the fruit from which it is made. If artificial color or flavor is added,

On account of the way cheese is sold at retail, it is an easy matter for a dealer to buy skim-milk cheese and sell same to his customers as cheese, and it seems to be quite the practice to do so—at least, they often sell skim-milk cheese as cheese.

A product made as above described, that contains less than 50 per cent milk fat in the water-free substance, cannot be legally sold as cheese, but must be sold as skim-milk cheese or part skim-milk cheese, as the case may be.

The retail dealers of the State are cautioned that the sale of skim-milk cheese as cheese is a violation of the law, and will be prosecuted if detected.

#### CHEESE AND SKIM-MILK CHEESE.

Laboratory Number	Milk Fat, Water-free Basis—Per Cent	Reading Refractometer on Fat, 40° C.	Refractive Index	Water—Per Cent	Remarks and Conclusions
14676	50.71	43.0	1.4545	35.47	Cheese.
14672	51.54	43.0	1.4545	35.15	do.
14671	31.57	43.5	1.4548	39.80	Part skim-milk cheese, sold as cheese; misrepresented; sale was illegal.
14670	50.00	43.5	1.4548	33.30	Cheese.
14675	50.56	43.0	1.4545	34.28	do.
14669	51.06	43.0	1.4545	33.79	do.
15471	54.74	43.0	1.4545	32.10	do.

the fact must be stated on the label, and the product must be sold as a compound or an imitation cider; otherwise it will be classed as adulterated or misbranded, and the sale prohibited.

The samples reported in the table below were sent to the Department for analysis.

The Department has no authority of law or funds for work under the prohibition law, but as the State makes no provision for the determination of alcohol in beverages, and as it is necessary to know the amount of alcohol present in many cases to enforce the law, the Department of Agriculture does this work when it can be done without interfering with the duties of the Department. Such examinations, however, cannot be made for dealers.

## RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler
14303	Wine, Claret.....	.....
15291	Cher-Ko.....	Normandie Co., Norfolk, Va.
15290	Gra-Ko.....	do.....
15289	Gin-Ko.....	do.....
15109	Shel-Io.....	Red Top Bottling Co., North Wilkesboro, N. C.
15080	Imitation Cider, Maybelle.....	The Pepsi-Cola Bottling Co., North Wilkesboro, N. C.
15079	Hot-Tom.....	Scales-Wilson Co., Greenville, S. C.
15403	Cher-Ko.....	Normandie Co., Norfolk, Va.
15402	Gra-Ko.....	do.....
15401	Gin-Ko.....	do.....
15108	.....	.....
15056	.....	.....
15395	.....	.....
15183	Shello, Blackberry Flavor.....	E. S. Shelby Vinegar Co., Richmond, Va.
15181	Ginger Ale, Cascade.....	Jas. M. Hines, Greenville, N. C.
14697	.....	.....
14585	Cider, Flat Foot, Fermented.....	Whitehead-Kiesel Co., Louisville, Ky.
14308	Sa-Cho-La, the Temperance Drink, The Sachola Co., Norfolk, Va.....	.....
15006	.....	.....
14734	.....	Richmond Cider and Vinegar Co., Richmond, Va.
14735	.....	do.....
15273	.....	.....
15008	.....	.....
15009	.....	.....
14736	.....	Richmond Cider and Vinegar Co., Richmond, Va.
14979	.....	Gast, Crofts & Co., Louisville, Ky.
14982	.....	D. J. Gregory Vinegar Co., Richmond, Va.
14980	.....	Gast, Crofts & Co., Louisville, Ky.

## CINNAMON EXTRACT

## DEFINITIONS AND STANDARDS

Cinnamon extract is the flavoring extract prepared from oil of cinnamon, and contains not less than 2 per cent by volume of oil of cinnamon.

Oil of cinnamon is the lead-free volatile oil obtained from the bark of the Ceylon cinnamon tree, and contains not less than 65 per cent by

## RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15583	Essence Cinnamon	Essence Cinnamon.	Aeme Drug Co., Raleigh, N.C.	W. A. Myatt, Raleigh.....
15061	Essence, Cinnamon, Brame's	.....do.....	Brame Drug Co., N. Wilkesboro, N. C.	Brame Drug Co., North Wilkesboro.

## CIDERS AND IMITATION CIDERS.

Laboratory Number	Retail Dealer or Party Who Sent Sample for Analysis	Alcohol — Per Cent (by Volume)	Remarks and Conclusions
14303	J. L. Adden, Keyser.....	10.35	Wine, intoxicating; sale illegal.
15291	Barnes-Harrell Co., Wilson, N. C.....	0.25	Imitation cider.
15290	.....do.....	0.27	do.
15289	.....do.....	0.35	do.
15109	W. A. Bullis, Clerk, N. Wilkesboro.....	None	Beverage.
15080	.....do.....	6.67	Imitation cider, intoxicating; sale illegal.
15079	.....do.....	0.16	Beverage.
15403	C. W. Cofield, Rocky Mount.....	None	Imitation cider.
15402	.....do.....	None	do.
15401	.....do.....	None	do.
15108	H. E. Dobbins, Chief Police, Rosemary.....	7.66	Compound cider, intoxicating; sale illegal.
15056	Jas. Ellison & Co., Washington.....	6.71	Compound cider; sale illegal under prohibition
15395	C. H. Griffin, Police, Monroe.....	7.45	do. [law.
15183	H. L. Joyner, Sheriff, Jackson.....	8.95	do.
15181	L. L. Kittrell, Mayor, Ayden.....	10.25	Intoxicating; sale illegal.
14697	F. C. Kugler, Mayor, Washington.....	8.65	Cider, intoxicating; sale illegal.
14585	J. D. Love, Policeman, Albemarle.....	5.80	do.
14308	A. S. Lyon, Supt., Rocky Mount.....	4.40	Intoxicating, misbranded; sale illegal.
15006	T. B. McCargo, Judge, Mount Airy.....	11.72	Compound wine, intoxicating; sale illegal.
14734	J. R. Nichols, Greenville, R. I.....	8.56	do.
14735	.....do.....	6.82	do.
15273	J. B. Readling, Mayor, Cornelius.....	6.73	Compound wine; sale illegal.
15008	Selma Cotton Mills, Selma.....	10.00	Imitation cider, intoxicating; sale illegal.
15009	.....do.....	9.95	do.
14736	J. R. Strickland, Greenville.....	11.65	Compound cider, intoxicating; sale illegal.
14979	J. D. Womack, Reidsville.....	6.61	Compound cider; sale illegal under prohibition
14982	.....do.....	7.66	Cider; sale illegal under prohibition law. [law.
14980	.....do.....	5.20	do.

weight of cinnamic aldehyde and not more than 10 per cent by weight of eugenol.

Six samples of cinnamon extract have been examined, all of which were standard, or above standard products. Sample No. 15069 was double strength, containing 4 per cent of oil, and sample No. 15883 is very concentrated, containing 11.40 per cent of cinnamon oil.

See results in table below.

## OF CINNAMON EXTRACTS.

Laboratory Number	Cinnamon Oil (by Precipitation) Per Cent	Alcohol — Per Cent (by Volume)	Remarks and Conclusions
15883	11.40	68.35	Cinnamon extract, very concentrated.
15061	2.20	.....	Cinnamon extract

## RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15882	Extract, Cinnamon, Blue Ribbon.	Extract, Cinnamon.	Greener-Lotspeich Mfg. Co., Knoxville, Tenn.	Rudy & Buffalo, Raleigh..
15881	do.....	do.....	do.....	Johnson & Broughton, Raleigh.
15070	Extract, Cinnamon, Hart's Excellence.	do.....	Sanford-Chamberlain & Albers Co., Knoxville, Tenn.	S. A. Dellart, Bryson.....
15069	Cinnamon Flavor, Cinnamon Flavor.		Dr. T. C. Smith, Asheville, N. C.	J. H. Dorsey, Bryson.....

## COFFEE AND COFFEE SUBSTITUTES

## DEFINITIONS AND STANDARDS

Coffee is the seed of a small tree, coffea.

Roasted coffee is coffee which by the action of heat has become brown and developed its characteristic aroma, and contains not less than 10 per cent of fat and 3 per cent of ash.

The principal active or stimulating constituent of coffee is caffeine, a white, bitter crystallizable alkaloid.

The principal material which is used to mix with and adulterate coffee is chicory, though certain cereals and leguminous seeds are often used.

## RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15327	Honeymoon, Coffee and Chicory Compound.	American Coffee Co., New Orleans, La.	J. M. Curtis & Son, Canton.....
15321	Valri, Pure Coffee.....	Aragon Coffee Co., South Richmond, Va.	Russell & Hilton, Salisbury.....
15337	Jarvina, Coffee and Chicory.	do.....	Ed. M. Cook, Concord.....
14721	Money-Saver, Coffee and Chicory.	do.....	Floyd Barwick, LaGrange.....
14711	Premium, Coffee and Chicory.	do.....	J. Long, Greenville.....
14710	do.....	do.....	York-Perkins & Co., Greenville..
14720	Henriche, Coffee and Chicory.	Bowers Bros., Richmond, Va.....	M. F. Waters, Mount Olive.....
14713	Ten Penny, Coffee and Chicory.	do.....	E. T. Joyner, Rocky Mount.....
15316	Sunny South, Coffee and Chicory.	Brazil Syndicate R. & B. Co., New York, N. Y.	I. A. Morris & Bro., High Point.

CINNAMON EXTRACTS—*Continued.*

Laboratory Number	Cinnamon Oil (by Precipitation) Per Cent	Alcohol—Per Cent (by Volume)	Remarks and Conclusions
15882	2.00	74.95	Cinnamon extract.
15881	2.60	69.50	do.
15070	2.40	-----	do.
15069	4.00	-----	do.

Chickory, cereals, or leguminous seeds are not added to coffee to give it strength, but to cheapen the product. The addition of chickory to coffee gives it a black, thick, soup-like appearance, but does not add anything to its real strength.

The sale of coffee containing chickory or any other substance, without stating the fact on the label, is an adulteration, and violation of the law.

A mixture of coffee and chicory when the coffee is in excess should be labeled coffee and chicory; when the chicory is in excess it should be labeled chicory and coffee.

The results of the examination of samples made during the year will be found in the table below.

## COFFEE AND COFFEE SUBSTITUTES.

Laboratory Number	Specific Gravity	Coffee, Per Cent	Chicory, Per Cent	Remarks and Conclusions
15327	1.01717	60.00	40.00	Compound coffee and chicory.
15321	1.00926	100.00	00.00	Coffee.
15337	1.01354	66.35	33.65	Compound coffee and chicory.
14721	1.02475	19.00	81.00	do.
14711	1.02552	16.00	84.00	Compound chicory and coffee, misbranded; should be labeled chicory and coffee, not coffee and chicory. Sale was illegal.
14710	1.02537	16.00	84.00	do.
14720	1.01502	72.00	28.00	Compound coffee and chicory.
14713	1.02059	42.00	58.00	Compound chicory and coffee, labeled coffee and chicory, misbranded; sale was illegal.
15316	1.01724	59.62	40.38	Coffee and chicory.

## RESULTS OF THE EXAMINATION OF COF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14717	Coffee and Chicory, Carhart's Country Blend.	Carhart's & Bros., New York, N.Y.	L. A. Monroe & Son, Laurinburg.
14722	Coffee and Chicory, Carhart's Country Blend	do.	E. A. Walters, LaGrange.
15317	Coffee and Chicory, Charmer.	Cheek-Neal Coffee Co., Nashville, Tenn.	I. A. Morris & Bro., High Point.
15334	Chicory and Coffee, Sum-Mo.	Columbia Coffee Mills, New Orleans, La.	J. C. Purell, Charlotte.
15331	Coffee and Chicory, Danne-miller's Noble Brand.	Dannemiller Coffee Co., New York, N. Y.	John Beam, Shelby.
14723	Coffee and Chicory Compound, Sweet Sixteen Blend.	Duryee & Barwise, New York, N.Y.	Byrum & Thompson, Edenton.
15333	Coffee, Chicory and Cereal Blend, Sweet Sixteen.	do.	Bridgers & Co., Charlotte.
15328	Coffee and Chicory, Englehard's Admiral Cup.	A. Englehard & Sons Co., Louisville, Ky.	W. H. Pearson, Canton.
15318	Coffee and Chicory, Dixie Dime.	O. H. Everhart, Greensboro, N. C.	A. A. Fouts, Thomasville.
14712	do.	do.	V. A. Gornto, Greenville.
15332	Coffee, No. 90 Hotel Blend	W. J. Fite, Charlotte, N. C.	W. J. Fite Cash Grocery, Charlotte.
14724	Coffee and Chicory, M. & M. Brand.	The Four Co., Norfolk, Va.	Byrum & Thompson, Edenton.
14728	Coffee and Chicory, Southern Belle.	Edwin J. Gillies & Co., New York, N. Y.	R. G. Hart, Rocky Mount.
14727	Coffee and Chicory, Astoria.	do.	do.
14725	do.	do.	R. B. White, Elizabeth City.
15338	Coffee, Special Brand Blend.	Griffin & Klutz, Matthews, N. C.	Griffin & Klutz, Matthews.
15339	Coffee and Chicory, Jackson Square.	Importers Coffee Co., New Orleans, La.	E. B. Liles, Rockingham.
14716	Coffee and Chicory, Old 76 Brand.	do.	N. C. Phillips & Co., Maxton.
14714	do.	do.	Pace Grocery Co., Maxton.
15323	Coffee and Chicory, Quip.	Levering Coffee Co., Baltimore, Md.	A. A. Craig, Lenoir.
15319	Coffee and Chicory, Our Special.	J. A. Morris & Bro., Thomasville, N. C.	J. A. Morris & Bro., Thomasville.
14715	Coffee and Chicory, Elephant Brand.	Potter, Sloane & O'Donohue Co., New York, N. Y.	E. L. Burns, Maxton.
15326	Coffee and Chicory, Gold Ribbon, Pan-American Blend.	do.	T. M. Cogburn & Bro., Canton.
15340	Coffee and Chicory, Blue Ribbon.	Palmer-Payne Co., Rockingham, N. C.	E. B. Morse, Rockingham.
15335	Coffee, Read's Tiger.	C. Read & Co., Baltimore, Md.	A. L. Riggins, Charlotte.
14726	Coffee and Chicory, Red Star.	Red Star Stores, Rocky Mount, N. C.	Red Star Stores, Rocky Mount.
14718	Coffee and Chicory, R. T. Brand.	Reily-Taylor Co., New Orleans, La.	Planters Trading Co., Laurinburg.
15325	Coffee and Chicory, Gold Seal.	Slayden-Fakes & Co., Asheville, N. C.	W. L. Barnett, Asheville.
14729	Coffee and Chicory, XXXX	Stokes Coffee Co., Baltimore, Md.	Winston Bros., Youngsville.



FEE AND COFFEE SUBSTITUTES—*Continued.*

Laboratory Number	Specific Gravity	Coffee, Per Cent	Chicory, Per Cent	Remarks and Conclusions
14717	1.01126	92.00	8.00	Compound coffee, and not blended coffee as labeled; misbranded; sale illegal.
14722	1.01274	84.00	16.00	Compound coffee and chicory.
15317	1.01678	62.12	37.88	do.
15334	1.02317	27.40	72.60	Compound chicory and coffee.
15331	1.01694	60.92	39.08	Compound coffee and chicory.
14723	1.01419	76.00	24.00	do.
15333	-----	-----	-----	Compound of coffee, chicory and cereal; not a blend; misbranded; sale illegal.
15328	1.01511	70.81	29.19	Compound coffee and chicory.
15318	1.01873	51.52	48.48	do.
14712	1.01931	49.00	51.00	Compound chicory and coffee.
15332	1.01453	74.40	25.60	Compound coffee and chicory and not a blend as branded; misbranded; sale illegal.
14724	1.01338	81.00	19.00	Compound coffee and chicory.
14728	1.01892	50.00	50.00	do.
14727	1.01534	70.00	30.00	do.
14725	1.01900	50.00	50.00	do.
15338	1.01102	93.42	6.58	Compound coffee and chicory and not a blend; misbranded; sale illegal
15339	1.01835	53.48	46.52	Compound coffee and chicory.
14716	1.01719	60.00	40.00	do.
14714	1.01792	56.00	44.00	do.
15323	1.01466	73.64	26.36	do.
15319	1.01789	56.08	43.92	do.
14715	1.01358	80.00	20.00	Compound coffee and chicory, adulterated; contains about 8 or 10 per cent of foreign mineral matter; sale illegal.
15326	1.01884	50.92	49.08	Compound coffee and chicory and not a blend as labeled; misbranded; sale illegal.
15340	1.01615	65.54	34.46	Compound, coffee and chicory.
15335	1.01025	100.00	00.00	Coffee.
14726	1.01545	70.00	30.00	Compound coffee and chicory.
14718	1.01321	82.00	18.00	do.
15325	1.01355	79.67	20.33	Coffee and chicory.
14729	1.01721	60.00	40.00	Compound coffee and chicory.

## RESULTS OF THE EXAMINATION OF COF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15324	Coffee and Chicory, Gold Seal.	Southern Coffee Co., Birmingham, Ala.	W. B. Ratliffe, Marion.....
15320	Coffee and Chicory, Red Cross.	Southern Coffee Co., New Orleans, La.	J. A. Morris & Bro., Thomasville.
14719	Coffee and Chicory, Red Cross.	do.....	Planters Trading Co., Laurinburg.
15330	.....	F. W. Wagener & Co., Charleston, S. C.	A. N. Jenkins & Co., Brevard....
15329	Coffee and Chicory, My Choice.	Edw. Weston Tea & Spice Co., St. Louis, Mo.	Thomason & Ramsey, Brevard..
15322	do.....	do.....	L. M. Park, Lenoir.....

## FLOUR

## DEFINITIONS AND STANDARDS.

Flour is the fine, clean, sound product made by bolting wheat meal and contains not more than 13.5 per cent of moisture, not less than 1.25 per cent of nitrogen, not more than 1 per cent of ash, and not more than 0.50 per cent of fiber.

REGULATION—*Self-Rising Flour*.

When a leavening agent or baking powder is added to flour and the flour becomes what is known as "self-rising flour" the same shall have plainly stated on the bag, barrel or other package, and in connection with the words "self-rising flour," the name of the acid salt of which the powder or leavening agent is made, as is provided for by regulation on baking powder.

Very little adulteration is found in flour, except what is produced by the bleaching of it. A food product is adulterated: If it be mixed, colored, powdered, coated or stained in a manner whereby damage or inferiority is concealed, or if it contains any added poisonous or other added deleterious substances which may render such food injurious to health.

The bleaching of flour by the nitrogen peroxide process leaves a small amount of the nitrogen peroxide, a poisonous substance, in the flour. Nitrogen peroxide is poisonous beyond question, and if much of it were left in the flour after bleaching it would unquestionably render the flour deleterious to health, and, therefore so adulterated that its sale would be positively prohibited, but the small amount of the poisonous substance left in the flour may not be sufficient to justify prohibiting its use in bleaching. Further scientific investigation will determine that point.

FEE AND COFFEE SUBSTITUTES—*Continued.*

Laboratory Number	Specific Gravity	Coffee, Per Cent	Chicory, Per Cent	Remarks and Conclusions
15324	1.01405	77.00	23.00	Compound coffee and chicory; misbranded; sale illegal.
15320	1.01607	65.97	34.03	Compound coffee and chicory.
14719	1.01907	50.00	50.00	do.
15330	1.01908	49.35	50.65	Compound, chicory and coffee; misbranded; sale illegal.
15329	1.01521	70.27	29.73	Compound coffee and chicory.
15322	1.01746	58.42	41.58	do.

But to be adulterated a food product does not have to contain a substance that renders it deleterious to health. It is deemed to be adulterated if it be mixed, colored, powdered, coated or stained so as to hide or conceal damage or inferiority.

If the bleaching of flour improves its appearance without improving its quality it would appear that bleaching tends to hide inferiority, and if so, then artificially bleached flour should be labeled bleached.

The food laws seem to attach just as much importance to misbranding food products as they do to the adulteration of them. In fact, adulteration and misbranding are so closely connected that it is hard to separate them. Many compounds if not labeled at all, would, under the food laws, be misbranded, when, if properly labeled or branded to show their real character their sale would be perfectly legal and legitimate.

If flour is bleached to appear better than the same flour would appear if unbleached, is there not good reason why it should be labeled bleached?

The Legislature of 1915 passed an act, known as the "Bleached Flour Law" which requires artificially bleached flour to be labeled "Artificially Bleached." The act provides for an inspection fee to bear the expense of the enforcement of the law.

A few mills, not in the State, but doing business in the State, objected to the law, and on the grounds that the act was in conflict with the Federal Statutes, and therefore, unconstitutional and void, asked the courts to enjoin the Commissioner of Agriculture, and prevent him from enforcing the act. The matter was heard by the State Superior Court and the court rendered an opinion to the effect that the act is constitutional and enforceable.

When the act went into effect the department began such efforts as were necessary for the enforcement of same, and examined 506 sam-

ples of flour. The results of the examination showed that some mills doing business in the State were complying with the law while others were not.

Since the court has held that the Bleached Flour Law is constitutional and enforceable, the department has resumed active effort to cause the law to be complied with.

The examination of the samples reported in table below was with regard to bleaching only, and were not examined for leavening agents.

The attention of mills making self-rising flour is called to the regulation above in regard to labeling self-rising flour.

## RESULTS OF THE EX

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15292	Flour, Tube Rose, Electrically Bleached.	Acme Milling Co., Talbot, Tenn.	L. A. Kincaid, Morganton.
15293	Flour, Forest King, Electrically Bleached.	do.	do.
15349	Flour, Sifted Snow, Electrically Bleached.	do.	John E. Fain, Murphy.
15659	Flour, Columbia.	Acme-Evans Co., Indianapolis, Ind.	S. J. Stallings, Littleton.
15366	Flour, Aetna Silk, Bleached	Aetna Mills Co., Wellington, Kans.	Hendersonville Grocery Co., Hendersonville.
15351	Flour, Gold Dollar, Bleached.	do.	J. A. Brown, Bryson City.
15367	do.	do.	Hendersonville Grocery Co., Hendersonville.
15376	do.	do.	Slayden-Fakes & Co., Asheville.
15440	Flour, Lady Lee, Self Rising.	Amendt Milling Co., Monroe, Mich.	Pearsall & Co., Wilmington.
15442	Flour, Regal, Bleached Electrically.	do.	do.
15171	Flour, Lotus.	do.	Matthews-Weeks Co. Rocky Mount.
15155	do.	do.	F. G. Paul & Bro., Washington.
15197	do.	do.	do.
15198	do.	do.	do.
15264	Flour, Baker's Pride.	Acadia Mill Co., Enterprise, N. C.	J. J. Adams Sons' Co., Winston- Salem.
14914	Flour, Capitola.	Atlanta Milling Co., Atlanta, Ga.	Harry Baber Co., Gastonia.
15134	Flour, Perfection.	Augusta Roller Mills, Staunton, Va.	B. D. Wilson, Aberdeen.
15131	Flour, Porcelain.	Augusta Roller Mills, Augusta, Ga.	Sanford Supply Co., Sanford.
15132	Flour, Oconeechee, Self Rising.	Austin-Heaton Co., Durham, N. C.	do.
15262	do.	do.	Bridgers & Co., Charlotte.
14998	Flour, Banner.	do.	Geo. A. Rose Co., Henderson.
15282	do.	do.	E. L. Kiser Co., Rural Hall.
15687	do.	do.	Rowland & Rogers, Raleigh.
15654	Flour, Our Pride.	do.	Geo. A. Rose Co., Henderson.
14996	do.	do.	Parham Supply Co., Henderson.
15259	do.	do.	Farmers Supply Co., Charlotte.
14995	Flour, Peerless.	do.	Byrd & Bryson, Durham.
15655	Flour, Peerless, Bleached.	do.	Geo. A. Rose Co., Henderson.
14994	Flour, Banner.	do.	Byrd & Bryson, Durham.

Many people object to using certain kinds of baking powder or leavening agents and are willing to pay a much higher price for other powders. In the sale of baking powder it is regarded that a purchaser has the right to know what kind of powder he receives. If that is true, and the powder or leavening agent is mixed with the flour, so as to render it self-rising, he still has the right to know what kind of baking powder or leavening agent he is using: Hence, the regulation on self-rising flour.

## AMINATION OF FLOUR.

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15292	Positive....	.....	Flour, artificially bleached.
15293	...do.....	.....	do.
15349	...do.....	.....	do.
15659	Negative....	Negative....	Flour, not bleached.
15366	...do.....	Positive....	Flour, artificially bleached.
15351	...do.....	...do.....	do.
15367	...do.....	...do.....	do.
15376	...do.....	...do.....	do.
15440	...do.....	...do.....	do.
15442	...do.....	...do.....	do.
15171	...do.....	...do.....	do.
15155	...do.....	...do.....	do.
15197	...do.....	Negative....	Flour, not bleached.
15198	...do.....	Positive....	Flour, artificially bleached.
15264	...do.....	Negative....	Flour, not bleached.
14914	Positive ....	.....	Flour, artificially bleached.
15134	Negative....	.....	Flour, not bleached.
15131	...do.....	.....	do.
15132	Positive ....	.....	Flour, artificially bleached; self rising.
15262	...do.....	.....	do.
14998	...do.....	.....	Flour, artificially bleached.
15282	...do.....	.....	do.
15687	...do.....	.....	do.
15654	...do.....	.....	do.
14996	...do.....	.....	do.
15259	...do.....	.....	do.
14995	...do.....	.....	do.
15655	...do.....	.....	do.
14994	...do.....	.....	do.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15352	Flour, Obelisk.....	Ballard & Ballard Co., Louisville, Ky.	C. E. Willhide, Bryson City.....
15706	Flour, Obelisk, Self-Rising Electrically Bleached.	.....do.....	Troxler Bros., Greensboro.....
15701	Flour, Obelisk, Electrically Bleached.	.....do.....	O. F. Pearce, Greensboro.....
15628	Flour, Obelisk.....	.....do.....	Amerieann Commission Co., Greensboro.
15600	Flour, Ballard's Choice Cream, Bleached Electri.	Ballard Flour Mills, Louisville, Ky.	D. W. Harden, Greenville.....
15641	Flour, Crystal.....	W. B. Barker's Sons, Winchester, Va.	R. G. Hiatt & Co., Greensboro...
14902	Flour, Strongfellow.....	Bay State Milling Co., Winona, Minn.	Adams Grain and Provision Co., Charlotte.
15057	Flour, Golden Grain.....	B. & T. Milling Co., Dimmette, N. C.	Surry-Wilkes-Yadkin Supply Co., Elkin.
15586	Flour, Sweet Rose, Bleached.	Bernet, Kraft & Kauffman Milling Co., St. Louis, Mo.	Sumrell & McCoy, Kinston.....
14907	Flour, Gold Band.....	Bethania Stock Co., Bethania, N. C.	Bennett Bros., Winston-Salem...
15283	.....do.....	.....do.....	A. J. Long & Son, Rural Hall...
14903	Flour, Rising Sun.....	Beverly Roller Mills, Broad Run, Va.	Johnston Bros., Charlotte.....
14919	.....do.....	.....do.....	Davidson & Wolfe, Charlotte.....
15363	Flour, Queen of Buncombe	Biltmore Milling Co., Biltmore, N.C.	Biltmore Milling Co., Biltmore..
15604	Flour, Superlative.....	Blank & Gottshall, Sunbury, Pa.	Pippin & Woolard, Washington..
15599	.....do.....	.....do.....	J. S. Smith, Greenville.....
15188	Flour, Success.....	Blish Milling Co., Seymour, Ind.	Heath-Morrow Co., Monroe.....
15451	Flour, Honey Boy.....	.....do.....	S. P. McNair, Wilmington.....
15189	Flour, Copyright.....	.....do.....	Heath-Morrow Co., Monroe.....
15453	.....do.....	.....do.....	S. P. McNair, Wilmington.....
15552	Flour, Wireless, Self Rising.	.....do.....	Ray Henderson, Jacksonville...
15576	Flour, Diamond A.....	Bingham & Co., Richmond, Va.	Hart & Harrington, Kinston.....
15258	Flour, Snow Drop.....	Bowman Bros., Germantown, Md.	W. J. Fite, Charlotte.....
15730	Flour, Defiance.....	A. Brinkley & Co., Norfolk, Va.	Riddick & Chappell, Hertford...
15232	Flour, Crown, Electrically Bleached.	Brockett & Sons, High Point, N. C.	T. J. Steed, High Point.....
15556	Flour, Aurora.....	Buffalo Flour Milling Co., Lewisburg, Pa.	W. B. Petteway, Jacksonville....
15715	Flour, Ben Franklin.....	.....do.....	Albemarle Wholesale Grocery Co., Edenton.
15622	Flour, Whole Wheat.....	Burke & Sons, Winston-Salem, N. C.	Farmers Union Agency Co., Winston-Salem
14886	Flour, Maple Leaf.....	Buena Vista Mills, Buena Vista, Va.	White-Morrison-Flowe Co., Concord.
15236	Flour, Primrose, Electrically Bleached.	.....do.....	J. W. Dellinger, Shelby, N. C....
14884	Flour, First Patent.....	Cabarrus Roller Mills, Concord, N. C.	White-Morrison-Flowe Co., Concord.
15414	Flour, Cascade, Bleached.	Cairo Milling Co., Cairo, Ill.	J. W. Carter Co., Maxton.....
15413	Flour, Silk, Bleached Electrically.	.....do.....	.....do.....
15431	.....do.....	.....do.....	J. H. Culbreth & Co., Fayettev'le
15478	.....do.....	.....do.....	M. J. Best & Son, Goldsboro.....
15452	Flour, High Patent.....	Carlyle Milling Co., Carlyle, Ill.	S. P. McNair, Wilmington.....

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15352	Positive		Flour, artificially bleached.
15706	do.		Flour artificially bleached, self rising.
15701	do.		Flour, artificially bleached.
15628	do.	do.	
15600	do.	do.	
15644	Negative	Negative	Flour, not bleached.
14902	do.	do.	
15057	do.	do.	
15580	Positive		Flour, artificially bleached.
14907	Negative		Flour, not bleached.
15283	do.	do.	
14903	do.	do.	
14919	do.	do.	
15363	do.	do.	
15604	do.	Negative	do.
15599	do.	do.	do.
15188	do.	do.	
15451	Positive	Negative	Flour, artificially bleached.
15189	Negative		Flour, not bleached.
15453	do.	Negative	do.
15552	do.	Positive	Flour, self rising, artificially bleached.
15576	Positive		Flour, artificially bleached.
15258	Negative	Negative	Flour, not bleached.
15730	Positive		Flour, artificially bleached.
15232	do.	do.	
15556	Negative	Negative	Flour, not bleached.
15715	do.	do.	do.
15622	do.	do.	do.
14886	Positive		Flour, artificially bleached.
15236	do.	do.	
14884	Negative		Flour, not bleached.
15414	Positive		Flour, artificially bleached.
15413	do.	do.	
15431	do.	do.	
15478	do.	do.	
15452	Negative	Negative	Flour, not bleached.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15441	Flour, Cupid, Bleached Electrically.	Carlyle Milling Co., Carlyle, Ill.	Pearsall & Co., Wilmington.....
15455	Flour, Uncle Sam, Self Rising	.....do.....	S. P. McNair, Wilmington.....
15454	Flour, Snow White.....	.....do.....	.....do.....
14924	Flour, Queen of the Valley.	I. L. Cosley, Grottoes, Va.	Harris & McNeely, Mooresville..
14925	Flour, Jersey Lily.....	.....do.....	.....do.....
15380	Flour, Catawba's Best.....	Catawba Milling Co., Hickory, N. C.	Shell Grocery Co., Hickory.....
14894	Flour, Angel Food.....	Charleston, Milling Co., Charles- ton, Mo.	Adams Grain & Provision Co., Charlotte.
15106	Flour, XXX Fancy Patent	City Flour Mill Co., Statesville, N. C.	Eagle & Milholland, Statesville..
15506	Flour, Sampson.....	Clinton Milling Co., Clinton, N. C.	J. C. Peterson, Clinton.....
15666	Flour, Lexington Cream.....	The Cockley Milling Co., Lexing- ton, Ohio.	Howard Jobbing Co., Weldon.....
15499	Flour, Rob Roy.....	W. A. Combs Milling Co., Cold Water, Mich.	J. H. Fonville, Warsaw.....
15603	.....do.....	.....do.....	Morris & Lassiter, Greenville....
15729	.....do.....	.....do.....	Riddick-Chappell, Hertford.....
15409	.....do.....	.....do.....	McLaurin & Shaw, Laurinburg..
15260	Flour, Cream of the Caro- linas.	Concord Milling Co., Concord, N. C.	Farmers' Supply Co., Charlotte.
14922	Flour, Avalanche.....	Crown Bros., North River, Va.	Davidson & Wolfe, Charlotte....
15350	Flour, The Peerless.....	Custom Roller Mills, Bryson City, N. C.	J. A. Brown, Bryson City.....
15557	Flour, Dan Valley.....	Dan Valley Mills, Danville, Va.	W. B. Petteway, Jacksonville....
15638	Flour, Dan Valley, Arti- ficially Bleached.	.....do.....	W. H. Moffitt, Lexington.....
15481	.....do.....	.....do.....	Deans & Moyer Co., Goldsboro..
15677	.....do.....	.....do.....	Wells Grocery Co., Wilson.....
15345	.....do.....	.....do.....	Lennon & Lennon, Chadbourn..
15699	Flour, DeSoto, Arti- ficially Bleached.	.....do.....	T. M. Bennett, Greensboro.....
15546	.....do.....	.....do.....	Lennon & Lennon, Chadbourn..
15510	.....do.....	.....do.....	J. A. Taylor, Wilmington.....
15645	.....do.....	.....do.....	R. G. Iliatt & Co., Greensboro..
15511	Flour, Superlative, Arti- ficially Bleached.	.....do.....	J. A. Taylor, Wilmington.....
15652	Flour, White Satin, Arti- ficially Bleached.	.....do.....	Powell-Landis Co., Henderson..
15634	Flour, New Age.....	Dixie Milling Co., Burlington, N.C.	G. G. Hendricks, Greensboro....
15270	.....do.....	.....do.....	.....do.....
15704	Flour, Dixie's Pride.....	.....do.....	Hepler Bros., Greensboro.....
15428	Flour, Aunt Rose, Self Rising, Bleached.	Dunlop Milling Co., Clarksville, Tenn.	Armfield Grocery Co., Fayette- ville.
15427	Flour, Dunlop's Best, Electrically Bleached.	.....do.....	.....do.....
15314	Flour, Mother Goose, Self Rising.	.....do.....	Adams Grain & Provision Co., Asheville.
15527	Flour, Flashlight.....	The Dunlop Mills, Richmond, Va.	Whitfield & French, Lumberton..
15529	Flour, Every Bodies.....	.....do.....	.....do.....
15408	Flour, Just-Rite, Self Rising.	The Dunlop Milling Co., Clarks- ville, Tenn.	McLaurin & Shaw, Laurinburg..



TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15441	Positive .....		Flour, artificially bleached.
15455		Negative...	Flour, not bleached.
15454	Negative... ..do .....		do.
14924	...do.....		do.
14925	...do.....		do.
15380	...do.....	Negative...	do.
14894	Positive .....		Flour, artificially bleached.
15106	...do.....		do.
15506	Negative... ..do .....	Negative...	Flour, not bleached.
15666	Positive .....		Flour, artificially bleached.
15499	...do.....		do.
15603	...do.....		do.
15729	...do.....		do.
15409	...do.....		do.
15260	...do.....		do.
14922	Negative... ..do .....		Flour, not bleached.
15350	...do.....	Negative...	do.
15557	...do.....	Positive...	Flour, artificially bleached.
15638	...do.....	...do.....	do.
15481	Positive .....		do.
15677	...do.....		do.
15545	Negative... ..do .....	Positive...	do.
15699	...do.....	...do.....	do.
15546	Positive .....		do.
15510	Positive .....		do.
15645	...do.....		do.
15511	...do.....		do.
15652	...do.....		do.
15634	Negative... ..do .....	Negative...	Flour, not bleached.
15270	...do.....		do.
15704	...do.....	Negative...	do.
15425	Positive .....		Flour, self rising, artificially bleached.
15427	...do.....		Flour, artificially bleached.
15314	...do.....		Flour, self rising, artificially bleached.
15527	Negative... ..do .....	Negative...	Flour, not bleached.
15529	...do.....	...do.....	do.
15408	Positive .....		Flour, artificially bleached.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15313	Flour, Just Rite, Self Rising.	The Dunlop Milling Co., Clarks-ville, Tenn.	Adams Grain and Provision Co., Asheville.
15512	Flour, Just-Rite, Electrically Bleached.	do.	J. A. Taylor, Wilmington.
15001	Flour, Dunlop's Superlative.	The Dunlop Mills, Richmond, Va.	P. A. Reavis Co., Louisburg.
15601	do.	do.	W. S. Fleming, Greenville.
14879	do.	do.	Peeler Co., Salisbury.
15530	Flour, Sea Foam.	do.	Whitfield & French, Lumberton.
15668	Flour, Olive Branch.	do.	Howard Jobbing Co., Weldon.
15237	Flour, Canna Lilly.	Eagle Roller Mills, Shelby, N. C.	J. N. Dellinger, Shelby.
15405	Flour, White Rose, Artificially Bleached.	Edinburg Milling Co., Edinburg, Va.	John F. McNair, Laurinburg.
15416	Flour, Blue Ribbon.	do.	J. W. Carter Co., Maxton.
15605	Flour, Puritan, Bleached.	Eldred Mill Co., Jackson, Mich.	C. G. Morris & Co., Washington.
15673	Flour, Puritan.	do.	P. L. Woodard & Co., Wilson.
15130	Flour, Golden Harvest.	Electric Milling Co., Siler City, N. C.	Sanford Grocery Co., Sanford.
15584	Flour, The Lakeside.	The Emery Thurwechter Co., Oak Harbor, O.	Jesse G. Brown, Kinston.
15670	Flour, Moss Rose.	Empire Roller Mills, Millersburg, O.	Woodard Bros., Wilson.
15672	Flour, Faultless.	Farmers' Milling Co., Bridgewater, Va.	P. L. Woodard & Co., Wilson.
15540	Flour, Peter Pan.	Ford Flour Co., Nashville, Tenn.	G. W. Boyette, Chadbourn.
15539	Flour, Flora.	do.	do.
15133	Flour, Merry Widow, Self Rising.	do.	B. D. Wilson, Aberdeen.
15496	do.	do.	Hobbs & Russ, Warsaw.
15588	Flour, Merry Widow.	do.	L. M. Savage, Greenville.
15538	do.	do.	G. W. Boyette, Chadbourn.
15583	do.	do.	Jesse G. Brown, Kinston.
15265	Flour, Rising Sun.	Forsyth Roller Mills, Winston-Salem, N. C.	Farmers Trade House Co., Winston-Salem.
15268	Flour, Superior, Self Rising	do.	Trade St. Grocery Co., Winston-Salem.
15733	Flour, Patapasco.	C. A. Gamberill Mfg. Co., Baltimore, Md.	W. T. Brown, Hertford.
15175	do.	do.	Geo. S. Edwards & Co., Rocky Mount.
15611	Flour, Pinnacle.	Garland Milling Co., Greensburg, Ind.	C. G. Morris & Co., Washington.
15297	Flour, Daisy.	Glen Alpine Milling Co., Glen Alpine, N. C.	E. A. Green Morganton.
15406	Flour, White Swan.	W. J. Gochenour, Penn Laird, Va.	John F. McNair, Laurinburg.
15689	Flour, Triumph.	Gooch Milling and Elevator Co., Lincoln, Neb.	T. B. Crowder & Son, Raleigh.
15664	Flour, Celestial.	The Goshen Milling Co., Goshen, Ind.	Weldon Grocery Co., Weldon.
15690	Flour, Pride of Alamance, Electrically Bleached.	Graham Milling Co., Graham, N. C.	Peebles Bros., Raleigh.
14873	do.	do.	A. W. Norwood, Graham.
15623	Flour, Farmers' Choice.	J. P. Green Milling Co., Mocksville, N. C.	J. L. Clements, Mocksville.

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15313	Positive .....		Flour, artificially bleached.
15512	...do.....		do.
15001	Negative .....		Flour, not bleached.
15601	Negative... Negative...	do.	
14879	...do.....	do.	
15530	...do..... Negative...	do.	
15668	...do.....	do.	
15237	Positive .....		Flour, artificially bleached
15405	...do.....	do.	
15416	...do.....	do.	
15605	Negative... Positive....	do.	
15673	...do.....	do.	
15130	...do.....		Flour, not bleached.
15584	...do..... Positive...		Flour, artificially bleached.
15670	...do..... Negative...		Flour, not bleached.
15672	Positive .....		Flour, artificially bleached.
15540	Negative... Positive....	do.	
15539	...do..... Negative...		Flour, not bleached.
15133	...do.....		Flour, self rising, not bleached.
15496	...do..... Negative...		Flour, not bleached.
15588	...do..... Positive....		Flour, artificially bleached.
15538	...do..... Negative...		Flour, not bleached.
15583	...do.....	do.	
15265	...do.....	do.	
15268	...do.....		Flour, self rising.
15733	Positive .....		Flour, artificially bleached.
15175	...do.....	do.	
15611	Negative... Negative...		Flour, not bleached.
15297	...do.....	do.	
15406	...do.....	do.	
15689	...do..... Positive....		Flour, artificially bleached.
15664	Positive .....	do.	
15690	...do.....	do.	
14873	...do.....	do.	
15623	Negative... Negative...		Flour, not bleached.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15625	Flour, Royal.....	J. P. Green Milling Co., Mockville, N. C.	Kurfes & Grainger, Mocksville.
15388	Flour, Always Ready, Self Rising.	Grimes Milling Co., Salisbury, N.C.	J. Fred. White Co., Salisbury....
15389	Flour, Silver Cloud.....	do.....	do.....
15387	do.....	do.....	H. Z. White, Salisbury.....
14883	do.....	do.....	Nassar Bros., Salisbury.....
15386	Flour, Grimes, Artificially Bleached.	do.....	H. Z. White, Salisbury.....
15626	Flour, Grimes' Best.....	Grimes Bros., Lexington, N. C.....	C. C. Sanford Son's Co., Mocksville.
15636	Flour, Our Best.....	do.....	W. H. Moffitt, Lexington.....
15234	do.....	do.....	P. H. Johnston, High Point.....
14897	Flour, Seal of Ohio.....	The Gwinn Milling Co., Columbus, Ohio.	Adams Grain and Provision Co., Charlotte.
14986	Flour, Gladstone.....	do.....	The Patterson Co., Greensboro..
15620	do.....	do.....	Stoneville Grocery Co., Stoneville
15594	Flour, Gwinn's Jefferson.....	do.....	E. H. Parkerson, Greenville.....
15086	Flour, Square Deal.....	do.....	City Grocery Co., Madison.....
14912	Flour, Jack Frost.....	J. Hales & Sons, Ionia, Mich.....	Gaston Seed and Provision Co., Gastonia.
14887	Flour, Cream of Wheat....	J. Hales & Sons, Lyons, Mich.....	White-Morrison-Flowe Co., Concord.
15547	Flour, Voigt's.....	Hall & Pearsall, Wilmington, N.C..	Brown Mercantile Co., Chadbourn.
14876	Flour, Aeme.....	Harmon & DeRindeau, Crimora, Va.	Merchants Supply Co., Burlington.
16466	Flour, Bouquet, Electrically Bleached.	Harrisonburg Milling Co., Harrisonburg, Va.	W. A. Myatt & Co., Raleigh.....
15571	Flour, Famo.....	Harris Milling Co., Mt. Pleasant, Mich.	E. K. Bishop & Co., New Bern...
15536	Flour, Tidal Wave, Artificially Bleached.	F. E. Hashagen Co., Wilmington, N. C.	D. J. Faulk, Chadbourn.....
15519	do.....	do.....	F. E. Hashagan Co., Wilmington.
15537	Flour, White Rose.....	do.....	D. J. Faulk, Chadbourn.....
15518	Flour, White Rose, Artificially Bleached.	do.....	F. E. Hashagen Co., Wilmington
15558	do.....	do.....	S. W. Aman & Son, Jacksonville.
15619	Flour, Haster's A. No. 1....	The Haster Milling Co., Toledo, O.	Stoneville Grocery Co., Stoneville
15640	Flour, Bobwhite.....	Allen Hedrick & Sons, Lexington, N. C.	R. L. Leonard, Lexington.....
15516	Flour, Polar Star.....	Heyer Bros., Wilmington, N. C.....	Heyer Bros., Wilmington.....
15517	Flour, Virginia.....	do.....	do.....
14871	Flour, All Wheat Straight.	Hico Milling Co., Burlington, N.C.	A. W. Norwood, Graham.....
14992	Flour, Hico Best.....	do.....	Southern Feed and Grocery Co., Durham.
15271	Flour, Daisy.....	W. G. Hinkle, Thomasville, N. C....	G. G. Hendricks, Greensboro....
14989	Flour, Baker's Choice.....	do.....	Thomas-Howard Co., Greensboro
14918	Flour, Mitylene.....	M. B. Hook, Bartonville, Va.....	Davidson & Wolfe, Charlotte....
14890	do.....	do.....	Cline & Moose, Concord.....
15598	Flour, Lotus, Bleached.....	Hooker & Anthony, Greenville, N. C.	Hooker & Anthony, Greenville..
15559	Flour, Voigts Self Rising...	W. T. Horn Co., Norfolk, Va.....	T. P. Ashford, New Bern.....
15627	Flour Ice Cream.....	Horne-Johnston Co., Mocksville, N. C.	C. C. Sanford Sons Co., Mocksville.

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15625	Negative	Negative	Flour, not bleached.
15388	Positive		Flour, artificially bleached.
15389	do.		do.
15387	do.		do.
14883	do.		do.
15386	do.		do.
15626	Negative	Negative	Flour, not bleached.
15636	do.	do.	do.
15234	do.		do.
14897	Positive		Flour, artificially bleached.
14986	do.		do.
15620	Negative	Negative	Flour, not bleached.
15594	do.		do.
15086	Positive		Flour, artificially bleached.
14912	do.		do.
14887	Negative		Flour, not bleached.
15547	Positive		Flour, artificially bleached.
14876	Negative		Flour, not bleached.
16466	Positive		Flour, artificially bleached.
15571	Negative	Negative	Flour, not bleached.
15536	Positive		Flour, artificially bleached.
15519	do.		do.
15537	do.		do.
15518	do.		do.
15558	do.		do.
15619	do.		do.
15640	Negative	Negative	Flour, not bleached.
15516	do.	Positive	Flour, artificially bleached.
15517	do.	Negative	Flour, not bleached.
14871	Positive		Flour, artificially bleached.
14992	do.		do.
15271	Negative	Negative	Flour, not bleached.
14989	do.		do.
14918	do.		do.
14890	do.		do.
15598	do.	Positive	Flour, artificially bleached.
15559	Positive		do.
15627	Negative	Negative	Flour, not bleached.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15621	Flour, Mocksville's Best.....	Horne-Johnston Co., Mocksville, N. C.	Kurfees & Grainger, Mocksville.
15257	.....do.....	.....do.....	Davidson & Wolfe, Charlotte....
15174	Flour, A. No. 1.....	The Hunter Milling Co., Toledo, O.	Geo. S. Edwards & Co., Rocky Mount.
14891	Flour, Imperial.....	Jefferson Milling Co., Charles-town, W. Va.	Adams Grain and Provision Co., Charlotte.
14888	Flour, Sunrise.....	.....do.....	J. E. Smith & Bro., Concord....
15493	Flour, Velveteen.....	.....do.....	Wilson & Hill, Warsaw.....
14900	Flour, Monogram.....	Johnson City Mill Co., Johnson City, Tenn.	Adams Grain and Provision Co. Charlotte
15643	Flour, Silver Star.....	Julian Milling Co., Julian, N. C.	R. G. Hiatt & Co., Greensboro..
15703	.....do.....	.....do.....	Hepler Bros., Greensboro.....
15090	Flour, Triumph.....	Kansas Milling Co., Wichita, Kas.	Hendersonville Grocery Co., Hendersonville.
15368	Flour, Golden Seal, Bleached.	.....do.....	.....do.....
15309	Flour, Lassen Perfection.....	.....do.....	Blue Ridge Grocery Co., Asheville
15502	Flour, Sincerety.....	King Milling Co., Lowell, Mich.	R. B. Herring & Co., Clinton....
15728	Flour, King Flake.....	.....do.....	Riddick-Chappell, Hertford....
15116	Flour, Pure Gold.....	.....do.....	C. S. Hollister Co., New Bern....
15553	.....do.....	.....do.....	Ray Henderson, Jacksonville....
15565	.....do.....	.....do.....	C. S. Hollister Co., New Bern....
14901	Flour, Cream Leaf.....	The Kingston Grain and Mill Co., Kingston, O.	Adams Grain and Provision Co., Charlotte.
15544	Flour, Koiner's Self Rising	Koiner Flour Mills, Richmond, Va.	Chadbourn Grocery Co., Chad-bourn.
15504	.....do.....	.....do.....	Amun Grocery Co., Clinton.....
15542	Flour, Pride of Richmond.....	.....do.....	Chadbourn Grocery Co., Chad-bourn.
15676	Flour, White Cloud.....	Lake View Mills, Danville, Va.	Wells Grocery Co., Wilson.....
15351	Flour, Larabee's Best.....	The Larabee Flour Mills, Hutcheson, Kans.	J. D. Earle Feed Co., Asheville..
14896	Flour, Town Talk.....	Lawrenceville Milling Co., Lawrenceville, Ind.	Adams Grain and Provision Co., Charlotte.
15307	Flour, Skylark, Self Rising	Lawrenceburg Roller Mills Co., Lawrenceburg, Ind.	Rogers Grocery Co., Asheville....
15306	Flour, Town Talk.....	.....do.....	.....do.....
15088	.....do.....	.....do.....	.....do.....
15551	.....do.....	.....do.....	Ray Henderson, Jacksonville....
15608	Flour, Miami.....	.....do.....	C. G. Morris & Co., Washington.
15190	Flour, Prize Medal.....	W. B. Lehman, Reid, Md.	F. B. Ashcraft, Monroe.....
15732	Flour, Golden South.....	Lewis-Hubbard-Slack Co., Norfolk, Va.	T. R. Winslow, Hertford.....
15152	Flour, Henry Clay.....	Lexington Roller Mills Co., Lexington, Ky.	C. G. Morris, Washington.....
15462	Flour, Vanity, Self Rising, Electrically Bleached.	Liberty Mills, Nashville, Tenn.	Samuel Bear, Sr., & Sons, Wil-mington.
14893	Flour, Southern Queen.....	The Loudonville Grain and Mill Co., Loudonville, O.	Adams Grain and Provision Co., Charlotte.
15660	Flour, Diamond.....	London Valley Milling Co., Pur-cellville, Va.	S. J. Stallings, Littleton.....

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15624	Negative...	Negative ..	Flour, not bleached.
15257	...do.....	...do.....	do.
15174	...do.....		do.
14891	...do.....		do.
14888	...do.....		do.
15493	...do.....	Negative...	do.
14900	...do.....		do.
15643	Negative...	Negative...	Flour, not bleached.
15703	...do.....	...do.....	do.
15090	Positive .....		Flour, artificially bleached.
15368	...do.....		do.
15309	...do.....		do.
15502	Negative...	Negative...	Flour, not bleached.
15728	...do.....	...do.....	do.
15146	...do.....		do.
15553	...do.....	Negative...	do.
15565	...do.....	...do.....	do.
14901	...do.....		do.
15544	...do.....	Negative...	do.
15504	...do.....	...do.....	do.
15542	...do.....	...do.....	do.
15676	Positive .....		Flour, artificially bleached.
15354	Negative...	Positive...	do.
14896	Positive .....		do.
15307	...do.....		do.
15306	...do.....	Negative...	Flour, not bleached.
15088	Negative...		do.
15551	...do.....	Negative...	do.
15608	...do.....	...do.....	do.
15190	...do.....		do.
15732	Positive .....		Flour, artificially bleached.
15152	Negative...		Flour, not bleached.
15462	Positive .....		Flour, artificially bleached.
14893	Negative...		Flour, not bleached.
15660	...do.....	Negative...	do.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15424	Flour, Gilt Edge.....	S. P. Lonas, Mt. Jackson, Va.....	Adams Grain and Provision Co., Fayetteville
15364	Flour, Callahan's Best, Artificially Bleached.	Louisville Milling Co., Louisville, Ky.	J. O. Houston & Son, Hender- sonville.
15177	Flour, Dolly Varden.....	do.....	G. J. Hales & Co., Rocky Mount.
15374	Flour, Dolly Varden, Artificially Bleached.	do.....	Slayden-Fakes & Co., Asheville.
15103	Flour, Mayflower.....	T. J. Lutz & Son, Lenoir, N. C.....	H. T. Newland, Lenoir.....
15104	Flour, Valley.....	do.....	do.....
15667	Flour, Faultless.....	Lynchburg Milling Co., Lynch- burg, Va.	Howard Jobbing Co., Weldon...
15151	Flour, Wasco, Self Rising.	Lyon & Greenleaf, Wascon, O.....	J. B. Johnson, Greenville.....
15148	do.....	do.....	T. P. Ashford, New Bern.....
14895	Flour, White Crest.....	The J. C. Lysle Mill Co., Leaven- worth, Kans.	Adams Grain and Provision Co., Charlotte.
15410	Flour, Scotland County's Best.	D. C. Lytch, Laurinburg, N. C.....	McLaurin & Shaw, Laurinburg ..
15370	Flour, Sunkist.....	Maney Milling Co., Omaha, Neb...	Hendersonville Grocery Co., Hendersonville.
15419	Flour, Manor House.....	J. D. Manor & Co., New Market, Va.	C. V. Williams & Co., Hamlet ..
15522	Flour, Royal.....	do.....	D. L. Gore Co., Wilmington.....
15685	Flour, Royal, Electrically Bleached.	do.....	Rowland & Rogers, Raleigh.....
15651	Flour, Sublime, Electric- ally Bleached.	do.....	Peebles Bros., Raleigh.....
15489	do.....	do.....	Goldboro Gro. Co., Goldsboro..
15154	Flour, Sublime.....	do.....	Pippin & Woolard, Washington..
15587	Flour, Aurora.....	Mayland Milling Association, Norfolk, Va.	Kinston Peanut Co., Kinston....
15581	Flour, White Rose.....	McAllister & Bell, Covington, Va.	Jesse G. Brown, Kinston.....
15586	Flour, Covington Roller Mills Choice.	do.....	do.....
15497	Flour, Nellie King, Elec- trically Bleached.	Middle Tennessee Milling Co., Tallahoma, Tenn.	McLaurin & Shaw, Laurinburg..
15420	Flour, Ann Arbor.....	Michigan Milling Co., Ann Arbor, Mich.	J. H. Culbreth & Co., Fayette- ville.
15612	do.....	do.....	E. R. Mixon & Co., Washington.
15569	do.....	do.....	E. K. Bishop & Co., New Bern..
15459	Flour, Ann Arbor, Matur'd	do.....	Brown & Loon, Wilmington.....
15568	Flour, Dinner Bell, Bleac'd	do.....	E. K. Bishop & Co., New Bern..
15674	Flour, Achilles, Bleached.	do.....	C. Woodard & Co., Wilson.....
15675	Flour, Moss Rose.....	J. D. & J. L. Miller, Millersburg, O.	Hadley-Harris Co., Wilson.....
15671	Flour, Victoria.....	do.....	P. L. Woodard & Co., Wilson.....
15617	Flour, Ideal.....	G. M. Mitchell & Son, Stoneville, N. C.	R. S. Thomas, Stoneville.....
15534	Flour, Cream of the Valley	Mitchell & Shank, Timberville, Va.	L. D. Caldwell, Lumberton.....
15725	Flour, Atlas.....	Model Mill Co., Johnson City, Tenn.	Rutenberg, Stokes & Darden, Hertford.
14913	Flour, Tip Top.....	do.....	Gaston Seed and Provision Co., Gastonia.
15390	Flour, Sensation, Self Rising, Electrically Bleached.	do.....	Peeler Co., Salisbury.....
14988	do.....	do.....	Thomas-Howard Co., Greensbo



TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15424	Negative	Negative	Flour, not bleached.
15364	Positive		Flour, artificially bleached.
15177	do.	do.	
15374	do.	do.	
15103	Negative		Flour, not bleached.
15104	do.	do.	
15667	do.	Negative	do.
15151	do.		Flour, self rising, not bleached
15148	do.	do.	
14895	Positive		Flour, artificially bleached.
15410	Negative		Flour, not bleached.
15370	do.	Negative	do.
15419	Positive		Flour, artificially bleached
15522	do.	do.	
15685	do.	do.	
15691	do.	do.	
15489	do.	do.	
15154	do.	do.	
15587	Negative	Negative	Flour, not bleached.
15581	do.	do.	do.
15586	do.	do.	do.
15407	Positive		Flour, artificially bleached.
15429	Negative	Positive	do.
15613	do.	do.	do.
15569	do.	do.	do.
15459	do.	do.	do.
15568	do.	do.	do.
15674	do.	do.	do.
15675	do.	Negative	Flour, not bleached.
15671	do.	do.	do.
15617	do.	do.	do.
15534	do.	do.	do.
15725	Positive		Flour, artificially bleached
14913	do.	do.	
15390	do.	do.	
14988	do.		Flour, self rising; artificially bleached.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15698	Flour, Sensation, Self Rising, Electrically Bleach'd	Model Mill Co., Johnson City, Tenn	T. M. Bennett, Greensboro
15532	Flour, Sensation, Electrically Bleached.	do	Birmingham & Co., Lumberton.
15526	Flour, Sensation.	do	E. Boushee, Wilmington.
15692	Flour, Sensation, Self Rising, Electric'y Bleached.	do	C. B. Gill & Co., Raleigh.
15632	do	do	Thomas-Howard Co., Greensboro,
15185	Flour, Monogram, Electrically Bleached.	do	Snyder-Huntley Co., Monroe.
15404	do	do	J. F. McNair, Laurinburg.
15531	do	do	Birmingham & Co., Lumberton.
15693	do	do	C. B. Gill & Co., Raleigh.
15460	Flour, White Cross.	do	J. W. Cooper, Wilmington.
15457	Flour, White Cross, Electrically Bleached.	do	Brown & Loon, Wilmington.
15497	do	do	J. B. Cox, Warsaw.
15288	Flour, Monarch.	do	Winston Grain Co., Winston-Salem.
15461	Flour, True Love.	do	J. W. Cooper, Wilmington.
15458	Flour, True Love, Self Rising,	do	Brown & Loon, Wilmington.
15637	Flour, Our Patent.	Model Mills, Lexington, N. C.	W. H. Moffitt, Lexington.
15119	Flour, Live Oak.	The Monarch Milling Co., Elizabethtown, Tenn.	J. M. Heaton, Elk Park.
15385	Flour, O. K.	Monitor Roller Mills, Claremont, N. C.	E. Q. Balick, Newton.
14927	Flour, Quality Satisfaction	Mooreville Flour Mills, Mooreville, N. C.	J. P. Mills, Mooreville.
15184	Flour, Golden Eagle.	G. D. Moose, Mt. Pleasant, N. C.	Mt. Pleasant Merc. Co., Mt. Pleasant.
15296	Flour, Burkes Choice.	Morganton Roller Mills, Morganton, N. C.	Shuping & Potent, Morganton.
15301	Flour, Belle of Tennessee, Bleached.	Morristown Flour Mills, Morristown, Tenn.	Asheville Grocery Co., Asheville.
15443	Flour, Full Value, Self Rising, Electrically Bleached.	do	Pearsall & Co., Wilmington.
15444	Flour, Gilt Edge, Bleached Electrically.	do	do
15344	do	do	Wofford-Fain Co., Murphy.
15543	do	do	Chadbourn Grocery Co., Chadbourn.
14916	do	do	Cochrane & McGlaughlin.
15299	Flour, Heyday, Self Rising Electrically Bleached.	do	Asheville Grocery Co., Asheville.
15300	Flour, Pinnacle, Electrically Bleached.	do	do
15091	Flour, Mother's, Self Rising.	Mountain City Mill Co., Chattanooga, Tenn.	Hendersonville Grocery Co., Hendersonville.
15311	Flour, Mother's Self Rising Electrically Bleached.	do	Blue Ridge Grocery Co., Asheville.
15418	do	do	C. V. Williams & Co., Hamlet.
15371	do	do	Hendersonville Grocery Co., Hendersonville.

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15698	Positive		Flour, self rising, artificially bleached
15532	do.		Flour, artificially bleached.
15526	do.		do.
15692	do.		do.
15632	do.		do.
15185	do.		do.
15404	do.		do.
15531	do.		do.
15693	do.		do.
15460	do.		do.
15457	do.		do.
15497	do.		do.
15288	Negative		Flour, not bleached.
15461	Positive		Flour, artificially bleached.
15458	do.		do.
15637	Negative	Negative	Flour, not bleached
15119	do.		do.
15385	do.	Negative	do.
14927	do.		do.
15184	do.		do.
15296	do.		do.
15301	Positive		Flour, artificially bleached.
15443	do.		Flour, self rising; artificially bleached.
15444	do.		Flour, artificially bleached.
15344	do.		do.
15543	do.		do.
14916	do.		do.
15299	do.		do.
15300	do.		do.
15091	do.		Flour, self rising, artificially bleached.
15311	do.		do.
15418	do.		do.
15371	do.		do.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15635	Flour, Mothers, Electrically Bleached.	Mountain City Mills Co., Chatanooga, Tenn.	G. G. Hendricks, Greensboro....
15310	Flour, Gold Medal, Electrically Bleached.	do.....	Blue Ridge Grocery Co., Asheville.
15365	do.....	do.....	Hendersonville Grocery Co., Hendersonville.
15514	do.....	do.....	A. B. Croom, Jr., Co., Wilming'n.
15501	do.....	do.....	L. P. Best, Warsaw.....
15682	do.....	do.....	J. H. Poole, Raleigh.....
15515	Flour, Ready Mixt., Bleached Electrically, Phosphate Leavening.	do.....	A. B. Croom, Jr., Co., Wilmington.
15490	do.....	do.....	Thornton & Banks Co., Goldsboro
15561	Flour, Ready Mixt, Bleached Electrically.	do.....	S. G. Roberts, New Bern.....
15287	Flour, Olympia, Electrically Bleached.	do.....	Winston Grain Co., Winston-Salem.
15312	do.....	do.....	Blue Ridge Grocery Co., Asheville.
15513	do.....	do.....	A. B. Croom, Jr., Co., Wilmington.
15491	do.....	do.....	Thornton & Banks Co., Goldsboro.
15369	Flour, White Satin, Electrically Bleached.	do.....	Hendersonville Grocery Co., Hendersonville.
15492	do.....	do.....	Thornton & Banks Co., Goldsboro.
14923	Flour, Silver Crest.....	Mt. Ulla Roller Mills, Mt. Ulla, N. C.	Harris & McNeely, Mooresville, N. C.
14929	do.....	do.....	H. W. Johnson, Mooresville.....
14928	Flour, Kitchen Queen.....	Mt. Ulla Roller Mills, Mt. Ulla, N. C.	J. P. Mills, Mooresville.....
14926	do.....	do.....	W. W. Rankin Co., Mooresville..
15479	Flour, Cream of Wheat, Artificially Bleached.	Mutual Milling & Supply Co., Harrisonburg, Va.	M. J. Best & Son, Goldsboro....
15554	Flour, White Wings.....	Nashville Roller Mills, Nashville, Tenn.	Tom Edwards, Jacksonville.....
15378	Flour, Silver Spray, Electrically Bleached.	Newport Mill Co., Newport, Tenn..	City Feed Co., Hickory.....
15373	Flour, Mothers Delight, Artificially Bleached.	do.....	W. H. King, Hendersonville.....
15298	Flour, Calla Lily, Electrically Bleached.	do.....	Asheville Grocery Co., Asheville.
15359	do.....	do.....	J. D. Earle Feed Co., Asheville..
15353	do.....	do.....	J. A. Brown, Bryson City.....
15089	do.....	do.....	Rogers Grocery Co., Asheville...
15383	Flour, Belle of Newton.....	Newton Roller Mills, Newton, N.C.	J. C. Gemayel, Newton.....
15384	Flour, Warlick's Best, Artificially Bleached.	do.....	Newton Grocery Co., Newton...
15083	Flour, Valley Pride.....	Nicholas Milling Co., Harrison, Va.	T. D. Meadow Grocery Co., Madison.
15084	Flour, Bob White.....	do.....	do.....
15616	do.....	do.....	E. Peterson & Co., Washington..
15669	Flour, Our Favorite.....	do.....	Wilson Wholesale Co., Wilson....

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15635	Positive		Flour, artificially bleached.
15310	do.		do.
15365	do.		do.
15514	do.		do.
15501	do.		do.
15682	do.		do.
15515	do.		Flour, self rising, artificially bleached.
15490	do.		do.
15561	do.		Flour, artificially bleached.
15287	do.		do.
15312	do.		do.
15513	do.		do.
15491	do.		do.
15369	do.		do.
15492	do.		do.
14923	Negative		Flour, not bleached.
14929	do.		do.
14928	do.		do.
14926	do.		do.
15479	Positive		Flour, artificially bleached.
15554	Negative	Negative	Flour, not bleached.
15378	Positive		Flour, artificially bleached.
15373	do.		do.
15298	do.		do.
15359	do.		do.
15353	do.		do.
15089	do.		do.
15383	Positive		do.
15384	do.		do.
15083	Negative		Flour, not bleached.
15084	do.		do.
15616	do.	Negative	do.
15669	do.	do.	do.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15688	Flour, Mt. Vernon.....	Northwestern Elevator & Mill Co., Toledo, O.	T. B. Crowder & Son, Raleigh...
15562	Flour, Melody.....	do.....	Armstrong Grocery Co., New Bern.
15719	Flour, "99".....	do.....	J. Broughton & Bro., Hertford...
15156	Flour, North Star.....	do.....	C. W. Stevens & Co., Elizabeth City.
15721	do.....	do.....	White & Co., Hertford.....
15157	Flour, "101".....	do.....	C. W. Stevens & Co., Elizabeth City.
15447	Flour, Silver Coin.....	do.....	H. L. Vollers, Wilmington.....
15705	Flour, North State.....	North State Milling Co., Greens- boro, N. C.	Hepler Bros., Greensboro.....
15706	Flour, North State, Elec- trically Bleached.	do.....	O. F. Pearce, Greensboro.....
15697	Flour, North State, Elec- trically Bleached.	North State Milling Co., Greens- boro, N. C.	T. M. Bennett, Greensboro.....
15642	do.....	do.....	Hiatt & Co., Greensboro.....
15694	Flour, Gate City, Electri- cally Bleached.	do.....	C. B. Gill & Co., Raleigh.....
15707	Flour, White Dove, Bleac'd	do.....	Troxler Bros., Greensboro.....
15058	Flour, Daniel Boone.....	North Wilkesboro Roller Mills, North Wilkesboro, N. C.	Pearson Bros., Wilkesboro.....
15718	Flour, O. M. Fancy Patent,	Orville Milling Co., Orville, O.....	Divers & Raper, Hertford.....
15372	Flour, South Land.....	Parris Bros., Inman, S. C.....	W. H. King, Hendersonville.....
15593	Flour, White Swan.....	Peninsular Milling Co., Flint, Mich.	Greenville Supply Co., Green- ville.
15172	do.....	do.....	Matthews-Weeks Co., Rocky Mount.
15176	Flour, White Rose.....	Pidgeon Milling Co., Pidgeon, Mich.	Geo. J. Hales Co., Rocky Mount.
14993	Flour, Argo, Self Rising.	Piedmont Mills, Lynchburg, Va.....	Southern Feed & Grocery Co., Durham.
15649	Flour, Argo, Self Rising, Artificially Bleached.	do.....	do.....
15276	Flour, Carnation.....	do.....	Piedmont Feed Store, Winston- Salem.
14892	do.....	do.....	Adams Grain and Provision Co., Charlotte.
15280	Flour, Piedmont, Artifi- cially Bleached.	do.....	W. H. Turner, Winston-Salem...
14990	Flour, Piedmont.....	do.....	Southern Feed & Grocery Co., Durham.
14987	do.....	do.....	The Patterson Co., Greensboro...
14882	do.....	do.....	Overman & Co., Salisbury.....
15696	Flour, Piedmont Patent, Electrically Bleached.	do.....	Z. E. Noah & Bro., Greensboro...
15650	Flour, Piedmont, Artifi- cially Bleached.	do.....	Southern Feed & Grocery Co., Durham.
15488	do.....	do.....	J. T. Ginn & Co., Goldsboro...
14999	Flour, Puritan.....	do.....	P. A. Reavis Co., Louisburg...
15500	do.....	do.....	J. H. Fonville, Warsaw.....
15657	do.....	do.....	Royal Feed & Grocery Co., Littleton.

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15688	Negative...	Negative...	Flour, not bleached.
15562	Positive .....		Flour, artificially bleached.
15710	Negative...	Negative...	Flour, not bleached.
15156	...do.....		do.
15721	...do.....	Negative...	do.
15157	...do.....	...do.....	do.
15417	...do.....	...do.....	do.
15705	Positive .....		Flour, artificially bleached.
15700	...do.....		do.
15697	...do.....		do.
15642	...do.....		do.
15694	...do.....		do.
15707	...do.....		do.
15958	Negative .....		Flour, not bleached.
15718	...do.....	Negative...	do.
15372	...do.....	...do.....	do.
15593	...do.....	...do.....	do.
15172	...do.....		do.
15176	...do.....		do.
14993	Positive .....		Flour, self rising; artificially bleached.
15649	...do.....		do.
15276	...do.....		Flour, artificially bleached.
14892	...do.....		do.
15280	...do.....		do.
14990	...do.....		do.
14987	...do.....		do.
14882	...do.....		do.
15696	...do.....		do.
15650	...do.....		do.
15488	...do.....	Negative...	do.
14999	...do.....		do.
15500	...do.....		do.
15657	...do.....		do.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15646	Flour, Hill City.....	Piedmont Mills, Lynchburg, Va....	Southern Feed & Grocery Co., Durham.
15000	Flour, Sublime.....	do.....	P. A. Reavis Co., Louisville.....
15275	Flour, Pride of Virginia.....	do.....	Piedmont Feed Store, Winston- Salem.
15596	Flour, Pioneer, Self Rising Bleached Electrically.	Pioneer Milling Co., Louisville, Ky.	E. H. Parkerson, Greenville.....
15615	Flour, Table Talk, Arti- ficially Bleached.	do.....	E. Peterson & Co., Washington..
15595	do.....	do.....	E. H. Parkerson, Greenville.....
15304	Flour, Pillsbury's Best XXXX	Pillsbury Flour Mills Co., Minne- apolis, Minn.	Asheville Grocery Co., Asheville
15607	do.....	do.....	C. G. Morris & Co., Washington.
15482	do.....	do.....	Deans & Moyer Co., Goldsboro..
15629	do.....	do.....	American Commission Co., Greensboro.
15235	do.....	do.....	P. H. Johnston, High Point.....
15302	Flour, Purina, WholeWheat	Purina Mills, St. Louis, Mo.....	Asheville Grocery Co., Asheville.
15631	Flour, Ready to Bake.....	Quaker City Flour Mills, Phila- delphia, Pa.	Stockton & Hire, Greensboro....
15566	do.....	do.....	C. S. Hollister, New Bern.....
15630	Flour, Quaker City.....	do.....	Stockton & Hire, Greensboro....
15661	do.....	do.....	Engene Johnston, Littleton.....
15610	Flour, Quaker.....	do.....	C. G. Morris & Co., Washington..
15695	do.....	do.....	C. B. Gill & Co., Raleigh.....
14899	do.....	do.....	Adams Grain & Provision Co., Charlotte.
15117	Flour, Rhyne's Best.....	Rhyne Bros., Gastonia, N. C.	Rhyne Bros., Gastonia.....
15382	Flour, Carnation.....	Rhyne-Yount & Co., Newton, N.C.	J. C. Gemayel, Newton.....
15498	Flour, Our Pride, Electri- cally Bleached.	Rocklane Milling Co., Weyers Cave, Va.	J. H. Fonville, Warsaw.....
15533	Flour, Guiding Star.....	do.....	L. D. Caldwell, Lumberton.....
15426	Flour, White House.....	M. A. Roundabush & Sons, Stanley Va.	Armfield Grocery Co., Fayette- ville.
15430	do.....	do.....	J. H. Culbreth & Co., Fayette- ville.
15577	Flour, Southern Pride, Artificially Bleached.	Round Hill Milling Co., Round Hill, Va.	Sumrell & McCoy, Kinston.....
15425	Flour, Southern Queen, Artificially Bleached.	do.....	Armfield Grocery Co., Fayette- ville.
15179	Flour, Uncle Sam.....	Saginaw Milling Co., Saginaw, Mich.	Geo. J. Hales & Co., Rocky Mount.
15505	Flour, "U. S.".....	do.....	J. C. Peterson, Clinton.....
15170	Flour, Upper Crust.....	do.....	Matthews & Weeks Co., Rocky Mount.
15477	do.....	do.....	M. J. Best & Sons, Goldsboro....
15423	Flour, White Rose.....	W. A. Shaver, Greenville, Va.....	Adams Grain & Provision Co., Fayetteville.
14898	Flour, Old Sleepy Eye.....	Sleepy Eye Flour Mill Co, Minne- apolis, Minn.	Adams Grain & Provision Co., Charlotte.
15238	do.....	do.....	D. N. Bost, Shelby.....
15348	Flour, Snap Shot, Electri- cally Bleached.	J. Allen Smith & Co., Knoxville, Tenn.	R. H. Hyatt, Murphy.....



TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15646	Positive .....		Flour, artificially bleached.
15000	Negative .....		Flour, not bleached.
15275	do. ....	Negative...	do.
15596	Positive .....		Flour, artificially bleached.
15615	do. ....		do.
15595	do. ....		do.
15304	Negative...	Negative...	Flour, not bleached.
15607	do. ....	do. ....	do.
15482	do. ....	do. ....	do.
15629	do. ....	do. ....	do.
15235	do. ....	do. ....	do.
15302	do. ....		do.
15631	do. ....	Negative...	do.
15566	do. ....	do. ....	do.
15630	do. ....	do. ....	do.
15661	do. ....	do. ....	do.
15610	do. ....	do. ....	do.
15695	do. ....	do. ....	do.
14899	do. ....	do. ....	do.
15117	Positive .....		Flour, artificially bleached.
15382	Negative...	Negative...	Flour, not bleached.
15498	Positive .....		Flour, artificially bleached.
15533	do. ....		do.
15426	Negative...	Negative...	Flour, not bleached.
15430	do. ....	do. ....	do.
15577	Positive .....		Flour, artificially bleached.
15425	do. ....		do.
15179	Negative...		Flour, not bleached.
15505	do. ....	Negative...	do.
15170	do. ....		do.
15477	do. ....	Negative...	do.
15423	Negative...	Negative...	Flour, not bleached.
14898	do. ....		do.
15238	do. ....	Negative...	do.
15348	Positive .....		Flour, artificially bleached

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14889	Flour, Plantation Mixed	J. Allen Smith & Co. Knoxville, Tenn.	Cline & Moose, Concord
15346	Flour, Sunbeam	do	R. H. Hyatt, Murphy
15355	Flour, Sunbeam, Electrically Bleached	do	J. D. Earle Feed Co., Asheville
15356	Flour, White Cream, Electrically Bleached	do	do
15357	Flour, Silver Loop, Electrically Bleached	do	do
15343	Flour, Roller King, Electrically Bleached	do	Wofford-Fain Co., Murphy
15136	Flour, Roller King	do	J. D. Horne, Wadesboro
15347	Flour, Florosa	do	R. H. Hyatt, Murphy
15345	Flour, Wofford-Fain	do	Wofford-Fain Co., Murphy
15341	Flour, White Cream, Electrically Bleached	do	do
15284	Flour, Hiki	J. A. Southern & Son, Walnut Cove, N. C.	Stokes Grocery Co., Walnut Cove
15417	Flour, Bob White	Southern Crown Milling Co., Asheboro, N. C.	C. V. Williams & Co., Hamlet
15263	Flour, Crown	South-Side Roller Mills, Winston- Salem, N. C.	J. J. Adams Sons Co., Winston- Salem
15714	Flour, "I-X-L", Artificially Bleached	South Rockwood Roller Mills, South Rockwood, Mich.	Albemarle Wholesale Grocery Co., Edenton
15261	Flour, Bakers' Favorite	J. L. Speck, Middletown, Md.	Farmers' Supply Co., Charlotte
15118	Flour, Golden Eagle	Sparger Mill Co., Bristol, Va.	F. H. Stinson, Banner Elk
15256	Flour, Mitylene	Springdale Flour Mills, Barton- ville, Va.	Davidson & Wolfe, Charlotte
15621	Flour, Economy	J. P. Sprinkle & Son, Lewisville, N. C.	Farmers Union Agency Co., Winston-Salem
15107	Flour, Presto	Star Milling Co., Statesville, N. C.	Eagle & Milholland, Statesville
15379	Flour, Monitor, Electrically Bleached	Statesville Flour Mill Co., States- ville, N. C.	Shell Grocery Co., Hickory
15105	Flour, Triumph	do	Eagle & Milholland, Statesville
15137	Flour, Southern Queen, Bleached	do	Leak & Marshall, Wadesboro
15122	do	do	Adams Grain & Provision Co., Fayetteville
15305	do	do	Rogers Grocery Co., Asheville
15523	do	do	D. L. Gore Co., Wilmington
14881	do	do	Overman & Co., Salisbury
15295	Flour, Palace, Electrically Bleached	do	P. F. Newton, Morganton
15279	do	do	W. H. Turner, Winston-Salem
15541	do	do	G. W. Boyette, Chadbourne
15521	do	do	D. L. Gore Co., Wilmington
14880	Flour, Palace	do	Overman & Co., Salisbury
15294	Flour, White Lilly	do	P. F. Newton, Morganton
15524	Flour, White Lilly, Electrically Bleached	do	D. L. Gore Co., Wilmington
15483	do	do	Deans & Moye Co., Goldsboro
15421	Flour, "Now Ready," Self Rising, Bleached Electrically	do	Adams Grain & Provision Co., Fayetteville
15535	do	do	L. D. Caldwell, Lumberton
15484	do	do	Deans & Moye Co., Goldsboro

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
14889	Positive.....		Flour, artificially bleached.
15346	...do.....		do.
15355	...do.....		do.
15356	...do.....		do.
15357	...do.....		do.
15343	...do.....		do.
15136	...do.....		do.
15347	...do.....		do.
15345	...do.....	Negative...	do.
15341	...do.....		do.
15284	Negative.....		Flour, not bleached.
15417	...do.....		do.
15263	...do.....	Negative...	do.
15714	Positive.....		Flour, artificially bleached.
15261	Negative...	Negative...	Flour, not bleached.
15118	...do.....		do.
15256	...do.....	Negative...	do.
15621	...do.....	...do.....	do.
15107	Positive.....		Flour, artificially bleached.
15379	...do.....		do.
15105	...do.....		do.
15137	...do.....		do.
15422	...do.....		do.
15305	...do.....		do.
15523	...do.....		do.
14881	...do.....		do.
15295	...do.....		do.
15279	...do.....		do.
15541	...do.....		do.
15521	...do.....		do.
14880	...do.....		do.
15294	...do.....		do.
15524	...do.....		do.
15483	...do.....		do.
15421	...do.....		Flour, self rising, artificially bleached.
15535	...do.....		Flour, artificially bleached.
15484	...do.....		do.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15381	Flour, Save Trouble, Self Rising, Electrically Bleached.	Statesville Flour Mill Co., States- ville, N. C.	Shell Grocery Co., Hickory.....
15277	do.....	do.....	W. H. Turner, Winston-Salem...
15520	Flour, Save Trouble, Bleached Electrically.	do.....	D. L. Gore Co., Wilmington.....
14904	Flour.....	do.....	Statesville Flour Mill Co., States- ville, N. C.
15658	Flour, Fancy Patent.....	Stephens City Roller Mills, Ste- phens City.	Royal Feed & Grocery Co., Lit- tleton.
15449	Flour, Stickell, Self Rising Electrically Bleached.	D. A. Stickell & Son, Hagerstown, Md.	The Worth Co., Wilmington.....
15450	Flour, Victor, Self Rising Electrically Bleached.	do.....	do.....
15315	Flour, Magnolia, Electri- cally Bleached.	do.....	Adams Grain & Provision Co., Asheville.
15463	do.....	do.....	Sam'l Bear, Sr., & Son, Wil- mington.
15503	Flour, Elegant, Electri- cally Bleached	do.....	Clinton Cash Grocery Co., Clinton.
14919	Flour, Elegant.....	do.....	F. D. Barkley & Co., Gastonia..
14909	Flour.....	do.....	do.....
15573	Flour, Stock's Best.....	F. W. Stock & Sons, Hillsdale, Mich.	Lucas & Lewis, New Bern.....
15173	Flour, Stock's Patent.....	do.....	Geo. S. Edwards & Co., Rocky Mount.
15579	do.....	do.....	Sumrell & McCoy, Kinston.....
15663	do.....	do.....	Weldon Grocery Co., Weldon...
15591	Flour, Stock's Best Patent	do.....	Greenville Supply Co., Green- ville.
15560	Flour, Nonpareil.....	do.....	S. G. Roberts, New Bern.....
15592	do.....	do.....	Greenville Supply Co., Green- ville.
15684	Flour, Acme, Artificially Bleached.	Strausburg Steam Flour Mills, Strausburg, Va.	J. H. Poole, Raleigh.....
15679	do.....	do.....	Capital Feed & Grocery Co., Raleigh.
15653	do.....	do.....	Powell-Landis Co., Henderson ..
15648	do.....	do.....	Southern Feed & Grocery Co., Durham.
16465	do.....	do.....	W. A. Myatt & Co., Raleigh.....
14908	Flour, "O. K.".....	A. A. Styers & Sons, Clemmons, N. C.	Bennett Bros., Winston-Salem...
15178	Flour, "I-X-L".....	John Strong & Son, South Rock- wood, Mich.	Geo. J. Hales & Co., Rocky Mount.
15085	Flour, Blue Ribbon.....	Summerfield Milling Co., Summer- field, N. C.	City Grocery Co., Madison.....
15286	Flour, Economy.....	do.....	Stokes Grocery Co., Walnut Cove
15285	Flour, Blue Ribbon.....	do.....	do.....
15639	Flour, Our Daily Bread...	Swing Bros., Lexington, N. C.	R. L. Leonard, Lexington.....
15574	Flour, Thoman's White Rose.	Thoman Milling Co., Lansing, Mich.	L. A. Cobb & Co., Kinston.....
15575	Flour, Calla Lilly.....	do.....	do.....
15633	Flour, Bakers Choice.....	Thomasville Roller Mills, Thomas- ville, N. C.	Thomas-Howard Co., Greens- boro.

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15381	Positive .....		Flour, artificially bleached.
15277	do. ....		do.
15520	do. ....		do.
14904	do. ....		do.
15658	Negative...	Negative...	Flour, not bleached.
15449	Positive .....		Flour, artificially bleached, self rising.
15450	do. ....		do.
15315	do. ....		Flour, artificially bleached.
15463	do. ....		do.
15503	do. ....		do.
14910	do. ....		do.
14909	do. ....		do.
15573	Negative...	Negative...	Flour, not bleached.
15173	do. ....		do.
15579	do. ....	Positive...	Flour, artificially bleached.
15663	do. ....	do. ....	do.
15591	do. ....	do. ....	do.
15560	do. ....	do. ....	do.
15592	do. ....	do. ....	do.
15684	Positive .....		do.
15679	do. ....		do.
15653	do. ....		do.
15648	do. ....		do.
16465	do. ....		do.
14908	Negative...		Flour, not bleached.
15178	Positive ....		Flour, artificially bleached.
15085	Negative...		Flour, not bleached.
15286	do. ....		do.
15285	do. ....		do.
15639	do. ....	Negative...	do.
15574	do. ....	do. ....	do.
15575	do. ....	do. ....	do.
15633	do. ....	do. ....	do.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15702	Flour, Home Comfort.....	Tom Milling Co., Sophia, N. C.....	Hepler Bros., Greensboro.....
14920	Flour, Champion.....	J. I. Triplett, Woodstock, Va.....	Davidson & Wolfe, Charlotte.....
15680	Flour, Monarch.....	do.....	Capital Feed & Grocery Co., Raleigh.
15412	Flour, Snowdrift.....	do.....	Currie-Patterson Co., Maxton..
15570	do.....	do.....	E. K. Bishop & Co., New Bern..
15686	Flour, Best Patent.....	do.....	Rowland & Rogers, Raleigh .....
15411	Flour, Ever Ready, Self Rising.	do.....	Currie-Patterson Co., Maxton..
15360	Flour, Royal Crown, Electrically Bleached.	Twin City Mill Co., Bristol, Va....	Levette & Thompson, Asheville.
15361	Flour, Pride of the South, Electrically Bleached.	do.....	do.....
15508	Flour, Valier's Romance, Self Rising.	Valier & Son, St. Louis, Mo.; Marine, Ill.	J. C. Peterson, Clinton.....
15507	Flour, Valier's Dainty.....	Valier & Spies Milling Co., St. Louis, Mo.	do.....
15432	Flour, Dainty.....	Valier & Spies Milling Co., Marine, Ill.	The Corbett Co., Wilmington ...
15436	Flour, Empress.....	do.....	do.....
15435	Flour, Romance, Self Ris'g	do.....	do.....
15434	Flour, Red Wing.....	do.....	do.....
15415	Flour, Coble "I. X. L." ..	Valier & Spies Co., St. Jacobs, Ill.	J. W. Carter Co., Maxton.....
15423	do.....	Valier & Spies Co., Marine, Ill.....	The Corbett Co., Wilmington...
15342	Flour, Veach's Highest.....	J. M. Veach Co., Adairsville, Ga....	Wofford-Fain Co., Murphy.....
14911	Flour, Gold Medal.....	John A. Vogtman, Bay City W. S., Mich.	F. D. Barkley & Co., Gastonia..
14915	do.....	do.....	Harry-Baber Co., Gastonia.....
15589	Flour, Voigts Royal.....	Voigt Milling Co., Grand Rapids, Mich.	L. M. Savage, Greenville.....
15550	do.....	do.....	Ray Henderson, Jacksonville...
15712	Flour, Voigts Royal, Electrically Bleached.	do.....	J. A. Woodard-Holmes Co., Edenton.
15614	do.....	do.....	E. Peterson Co., Washington ...
15564	do.....	do.....	Armstrong Grocery Co., New Bern.
15438	Flour, Voigts Royal.....	do.....	Hall & Pearsall, Wilmington...
15150	do.....	do.....	J. B. Johnson, Greenville.....
15525	do.....	do.....	E. Boushee, Wilmington.....
15437	Flour, Voigts Self Rising..	do.....	Hall & Pearsall, Wilmington...
15590	do.....	do.....	L. M. Savage, Greenville.....
15464	Flour, Snow Drift.....	do.....	Sam'l Bear, Sr., & Sons, Wil- mington.
15445	Flour, Colonial.....	H. L. Vollers, Wilmington, N. C....	H. L. Vollers, Wilmington.....
15267	Flour, Pond Lilly.....	Wachovia Mills, Winston-Salem, N. C.	Trade St. Grocery Co., Winston- Salem.
14906	Flour, Pride of Salem.....	do.....	Bennett Bros., Winston-Salem...
15266	do.....	do.....	Trade St. Grocery Co., Winston- Salem.
15528	Flour, Dunlops Superla- tive.	Warner-Moore Co., Richmond, Va.	Whitfield & French, Lumberton.
14878	Flour, Gold Medal.....	Washburn-Crosby Co., Minne- apolis, Minn.	Peeler Co., Salisbury.....
15153	do.....	do.....	C. G. Morris, Washington.....
15582	Flour, Acme Roller Mills Defender.	The Washington Milling Co., Washington C. H., Ohio.	Jesse G. Brown, Kinston.....

TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15702	Negative.....		Flour, not bleached.
14920	do.....		do.
15680	do.....	Negative.....	do
15412	do.....	do.....	do.
15570	do.....	do.....	do.
15686	do.....	do.....	do.
15411	do.....	do.....	do.
15360	Positive .....		Flour, artificially bleached.
15361	do.....		do.
15508	do.....		Flour, not bleached.
15507	Negative... Negative...		do.
15432	do.....	do.....	do.
15436	do.....	do.....	do.
15435	do.....	do.....	do.
15434	do.....	do.....	do.
15415	do.....	do.....	do.
15433	do.....	do.....	do.
15342	Positive .....		Flour, artificially bleached.
14911	Negative .....		Flour, not bleached.
14915	do.....		do.
15589	do.....	Negative .....	do.
15550	do.....	do.....	do.
15712	Positive .....		Flour, artificially bleached.
15614	do.....		do.
15564	do.....		do.
15438	do.....		do.
15150	do.....		do.
15525	do.....		do.
15437	Negative... Negative...		Flour, not bleached, self rising.
15590	Positive .....		Flour, artificially bleached.
15464	Negative... Negative...		Flour, not bleached.
15445	do.....	do.....	do.
15267	do.....	do.....	do.
14906	Positive .....		Flour, artificially bleached.
15266	Negative... Negative...		Flour, not bleached.
15528	do.....	do.....	do.
14878	do.....		do.
15153	do.....		do.
15582	Positive .....		Flour, artificially bleached.

## RESULTS OF THE EXAMINA

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15567	Flour, Monitor.....	The Washington Milling Co., Washington C. H., Ohio.	C. S. Hollister, New Bern.....
15158	.....do.....	.....do.....	D. R. Morgan & Co., Elizabeth City.
15120	Flour, Best Patent.....	Watauga Flour Mill, Elizabeth- town, Tenn.	Edgar Tufts, Elk Park.....
15641	Flour, Purity, Electrically Bleached.	W. A. Watson & Co., Greensboro, N. C.	Hiatt & Co., Greensboro.....
15709	.....do.....	.....do.....	S. S. Morris, Greensboro.....
15708	.....do.....	.....do.....	Troxler Bros., Greensboro.....
15710	Flour, Universal, Self Rising.	.....do.....	S. S. Morris, Greensboro.....
15269	Flour, Star.....	.....do.....	The Patterson Co., Greensboro..
15585	Flour, Perfection.....	.....do.....	Jesse G. Brown, Kinston.....
15480	Flour, New Perfection.....	.....do.....	B. G. Thompson & Son, Goldsboro
15487	Flour, Wilco.....	.....do.....	J. T. Ginn & Co., Goldsboro....
15665	Flour, Puritan, Artifi- cially Bleached.	Wells-Abbott-Neiman Co., Schuyler, Neb.	Weldon Grocery Co., Weldon....
15720	Flour, Sunlight, Artifi- cially Bleached.	.....do.....	J. Broughton & Bro., Hertford..
15716	.....do.....	.....do.....	W. R. Brothers, Edenton.....
15662	Flour, Golden West, Artifi- cially Bleached.	.....do.....	Weldon Grocery Co., Weldon....
15059	Flour, Our Pride.....	R. M. Whealton, Charlotte, N. C.	R. M. Whealton, Charlotte .....
15647	Flour, Melrose.....	White Star Mills, Staunton, Va.	Southern Feed & Grocery Co., Durham.
15420	.....do.....	.....do.....	C. V. Williams, Hamlet.....
15138	.....do.....	.....do.....	Leak & Marshall, Wadesboro....
15678	.....do.....	.....do.....	Capital Feed & Grocery Co., Raleigh
15439	Flour, Perfection.....	The Williams Bros. Co., Kent, O.	Hall & Pearsall, Wilmington....
15448	Flour, King Cotton, Self Rising.	Williams Bros. Co., Kent, Ohio....	The Worth Co., Wilmington.....
15281	Flour, Better than Gold..	W. T. Wilson & Sons, Rural Hall, N. C.	E. L. Kiser Co., Rural Hall.....
15724	Flour, Lotus, Bleached...	E. L. Woodard & Co., Norfolk, Va.	Rutenberg, Stokes & Darden, Hertford.

## HONEY

## DEFINITIONS AND STANDARDS.

Honey is the nectar and saccharine exudations of plants gathered, modified, and stored in the comb by honey bees; is levorotatory, contains not more than 25 per cent of water, not more than 0.25 per cent of ash, and not more than 8 per cent of cane sugar.

The principal adulteration of honey consists of the addition of either or both cane sugar sirup or glucose sirup, either of which is fairly easy to detect. It is also not an uncommon practice to feed bees, when



TION OF FLOUR—*Continued.*

Laboratory Number	Test for Nitrous Nitrogen	Test for Chlorine	Remarks and Conclusions
15567	Positive .....		Flour, artificially bleached.
15158	...do.....		do.
15120	Negative.....		Flour, not bleached.
15641	Positive .....		Flour, artificially bleached.
15709	...do.....		do.
15708	...do.....		do.
15710	...do.....		do.
15269	...do.....		do.
15585	Negative... ..	Negative... ..	Flour, not bleached.
15480	...do.....	...do.....	do.
15487	...do.....	...do.....	do.
15665	Positive .....		Flour, artificially bleached.
15720	...do.....		do.
15716	...do.....		do.
15662	...do.....		do.
15059	...do.....		do.
15647	...do.....		do.
15420	...do.....		do.
15138	...do.....		do.
15678	...do.....		do.
15439	Negative... ..	Negative... ..	Flour, not bleached.
15448	...do.....	...do.....	do.
15281	...do.....		do.
15724	...do.....	Positive....	Flour, artificially bleached.

flowers are scarce, with sugar in some form to carry them along till they can get a supply of nectar from flowers. But in order to lessen the work of the hive and to increase production, cane sugar is sometimes fed abundantly and continuously when it is not at all necessary to the bees.

This cane sugar, more or less converted by the bees into invert sugar, is laid down in the comb; but according to the definition given above, is not, strictly speaking, true honey, and is regarded as an adulteration. The proprietor does not add the cane sugar to the honey himself, but causes his employees, the bees, to do so.

Under the Food Law two or more like substances when mixed together constitute a blend. Mixtures of unlike substances do not constitute a blend. Sirup and honey are not like substances and a mixture of the two

# RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14967	Honey, Blakeley's	Honey.....	W. B. Blakeley & Co., Winston-Salem, N. C.	L. B. Rogers, Charlotte....
14943	Honey, Blakeley's Blended.	Honey, Blended.....	do.....	D. M. Miller & Son, Salisbury.
14326	do.....	do.....	do.....	Salem Supply Co., Winston-Salem.
12698	Honey, Harmon Packed.	Honey.....	Chas. W. Harmon & Co., Asheville, N. C.	Chas. W. Harmon, Asheville.
12699	do.....	do.....	do.....	do.....
14457	do.....	do.....	H. W. Konig, Wilmington, N. C.	H. W. Konig, Wilmington.
14946	Honey, Gold Med'l	do.....	Fred. W. Muth Co., Cincinnati, Ohio.	Shell-Mitchell Grocery Co., Hickory.
14316	Honey, Airline Bee	do.....	The A. I. Root Co., Medina, O.	H. O. Mattox, Dunn.....
14952	Comb Honey, Pure	do.....	W. J. Shields, Tryon, N. C.	W. T. Lunsford, Asheville..
13236	do.....	do.....	do.....	W. J. Shuford, Hickory....
14582	do.....	Honey.....	do.....	H. A. Waycaster, Reidsville

## ICE-CREAM AND ICE-CREAM SUBSTITUTES

### DEFINITIONS AND STANDARDS.

Ice-cream is a frozen product made from cream and sugar, with or without a natural flavoring, and contains not less than 10 per cent of milk fat.

Fruit ice-cream is a frozen product made from cream, sugar, and sound, clean, mature fruits, and contains not less than 8 per cent of milk fat.

Nut ice-cream is a frozen product made from cream, sugar, and sound nonrancid nuts, and contains not less than 8 per cent of milk fat.

Many products, such as eggs, gelatine, etc., are used in the manufacture of so-called ice-cream, which is often very palatable, but which is not ice-cream, and if sold as such is a violation of the law.

Realizing that many dealers would desire to sell and many consumers desire to obtain cheaper products than a standard ice-cream, the Board of Agriculture made a regulation under which any product, not deleterious to health, can be legally sold in the State. The regulation merely provides that if the dealer will make known by placard or label the kind of product offered for sale by him, the Department will not contest the sale.

does not constitute a blend. Samples No. 14329 and 14943, labeled "Blended Honey," are not blends and are therefore misbranded.

See table below.

#### HONEY AND SUBSTITUTES FOR HONEY.

Laboratory Number	Polarization, Direct, 20° C. °V	Polarization, Invert, 20° C. °V	Sucrose (Clerget), Per Cent	Glucose (Leach's Formula), Per Cent	Solids, Per Cent	Remarks and Conclusions
14967	-16.0	-22.0	4.52	None	77.59	Honey.
14943	-10.0	-26.4	12.36	None	79.86	Compound honey and refiners syrup, misbranded; sale illegal.
14326	28.0	-22.0	37.69	None	82.18	Honey, containing added cane sugar. Adulterated and misbranded. Sale illegal.
12698	-14.0	-18.0	3.00	None	-----	Honey.
12699	-17.0	-22.0	3.70	None	-----	do.
14457	-14.0	-17.6	2.71	None	82.08	do.
14946	-16.0	-19.8	2.86	None	77.82	do.
14316	-14.0	-17.6	2.71	None	82.08	do.
14952	4.0	0.0	3.00	0.57	80.76	do.
13236	-14.0	-22.0	6.00	None	82.90	do.
14582	-23.0	-29.7	5.55	None		do.

#### REGULATION OF SALE OF ICE-CREAM SUBSTITUTES.

The sale of a product as ice-cream, containing gelatine, eggs, gum tragacanth or other vegetable gums, or the sale of a product as ice-cream which contains less than the required per cent of milk fat will not be contested: *Provided*, the same is labeled and sold as imitation ice-cream, compound ice-cream, gelatine ice-cream, egg ice-cream, milk ice-cream, or gum ice-cream (as the case may be); or if a placard bearing the following statement—

"Imitation ice-cream is served here."

"Compound ice-cream is served here."

"Egg ice-cream is served here."

"Gelatine ice-cream is served here."

"Milk ice-cream is served here," or

"Gum ice-cream is served here,"

(as the case may be) shall be posted in a conspicuous place in the room where any and all persons may see the same when purchasing cream; and *Provided further*, that the statement on the placard is printed in plain black letters, not less than one inch in size, on a white background.

Many of the samples examined last year were below standard, but some of the dealers had complied with the law by using a sign provided

for by the regulation to show customers purchasing ice-cream that the products offered for sale by them were not ice-creams, but were substitutes for same.

The Department felt encouraged and hoped after the 1914 report was published that dealers would protect themselves by the use of the sign provided for by the Ice-cream Regulation, but the officials have been disappointed, and inspections of 1915 show that dealers are still selling substitutes for ice-cream as ice-cream in violation of the law. If a dealer wishes to sell an inferior product and a purchaser wishes to buy same they have a perfect right to do as they wish, and the Department

## RESULTS OF THE EXAMINATION OF ICE

Laboratory Number	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15193	Ice Cream, Vanilla.....	Arctic Ice and Coal Co., Greens- boro, N. C.	Crabtree Drug Co., Sanford.....
15194	.....do.....	.....do.....	Pope & Stallings, Clayton.....
15222	.....do.....	.....do.....	Hennese Cafe, Greensboro.....
15218	.....do.....	.....do.....	Fariss-Klutz Drug Co., Greens- boro.
15217	.....do.....	.....do.....	Elm St. Pharmacy, Greensboro..
15195	Ice Cream, Chocolate.....	.....do.....	Pope & Stallings, Clayton.....
15219	Ice Cream, Vanilla.....	.....do.....	W. Aydelet, Greensboro.....
14760	Ice Cream Compound.....	Betts, Ice Cream Co. Raleigh, N. C.	Betts Ice Cream Co., Raleigh....
14761	.....do.....	.....do.....	.....do.....
15223	Ice Cream, Vanilla.....	Brannon-Hahn, Charlotte, N. C.	Gem Cafe, Charlotte.....
15229	.....do.....	.....do.....	Reese-Stowe Co., Charlotte.....
15224	.....do.....	.....do.....	Charlotte Drug Co., Charlotte.....
15228	Ice Cream, Chocolate.....	.....do.....	Reese-Stowe Co., Charlotte.....
14624	Ice Cream, Vanilla.....	J. C. Brantley, Raleigh, N. C.	J. C. Brantley, Raleigh.....
14623	.....do.....	.....do.....	.....do.....
15123	.....do.....	.....do.....	.....do.....
15124	Ice Cream, Chocolate.....	.....do.....	.....do.....
15102	Ice Cream, Peach.....	California Fruit Store, Raleigh, N. C.	California Fruit Store, Raleigh..
15101	Ice Cream, Vanilla.....	.....do.....	.....do.....
15167	.....do.....	Dr. D. S. Chapman, Durham, N.C.	Rexall Pharmacy, Durham.....
15220	Ice Cream, Chocolate.....	Conyers & Sykes, Greensboro, N.C.	Conyers & Sykes, Greensboro....
15221	Ice Cream, Vanilla.....	.....do.....	.....do.....
14626	Ice Cream, Strawberry.....	A. Dughi, Raleigh, N. C.	A. Dughi, Raleigh.....
14625	Ice Cream, Vanilla.....	.....do.....	.....do.....
15114	Ice Cream Compound.....	.....do.....	.....do.....
15113	.....do.....	.....do.....	.....do.....
15115	.....do.....	.....do.....	.....do.....
14764	Ice Cream.....	.....do.....	.....do.....
15474	.....do.....	P. Ferranti, Raleigh, N. C.	P. Ferranti, Raleigh.....
15246	Ice Cream, Vanilla.....	G. Franck, Kinston, N. C.	G. Franck, Kinston.....
15216	.....do.....	.....do.....	Greensboro Drug Co., Greensboro
15191	.....do.....	Gurley's Drug Store, Sanford, N.C.	Gurley's Drug Store, Sanford....
15161	Ice Cream Compound.....	Haywood & Boone, Durham, N.C.	Haywood & Boone, Durham.....
15162	.....do.....	.....do.....	.....do.....
15122	Ice Cream Chocolate.....	Henry T. Hicks, Raleigh, N. C.	Henry T. Hicks, Raleigh.....

has no objection to the sale, but on the other hand, if the purchaser wishes a good product, and asks for ice-cream and pays his money for ice-cream he has a right to expect and to get ice-cream.

In the past the Department has dismissed cases on the plea of the dealer that he did not know the requirements. In the future such excuses can not be accepted by the Department, and dealers will have to settle such cases with the courts.

The results of the examination of eighty-one samples of ice-cream and ice-cream substitutes made during the year will be found in table below.

# CREAM AND ICE CREAM SUBSTITUTES.

Laboratory Number	Fat, Milk, Per Cent	Reading Refractometer on Fat, 40° C.	Refractive Index	Remarks and Conclusions
15193	8.08	44.0	1.4552	Ice cream, vanilla; below standard; no sign; sale illegal.
15194	7.89	44.0	1.4552	do.
15222	7.23	44.0	1.4552	do.
15218	7.55	44.0	1.4552	do.
15217	7.18	44.0	1.4552	do.
15195	6.92	44.0	1.4552	Ice cream, chocolate; below standard; no sign; sale illegal.
15219	3.49	44.0	1.4552	Im.ice cream, sold as ice cream; much below standard; no sign; sale illegal.
14760	2.44	-----	-----	Imitation ice cream, vanilla, much below standard; sign up; place of business dirty and insanitary.
14761	3.78	-----	-----	do.
15223	7.65	44.0	1.4552	Ice cream, vanilla; below standard, no sign; sale illegal.
15229	11.70	44.0	1.4552	Ice cream, vanilla.
15224	7.77	44.0	1.4552	Ice cream, vanilla; below standard; no sign; sale illegal
15228	7.17	44.0	1.4552	Ice cream, below standard; no sign; sale illegal.
14624	15.15	-----	-----	Ice cream, vanilla.
14623	14.60	-----	-----	do.
15123	11.12	44.5	1.4556	do.
15124	11.26	44.5	1.4556	Ice cream, chocolate.
15102	13.71	45.0	1.4559	Ice cream, peach.
15101	17.45	45.0	1.4559	Ice cream, vanilla
15167	5.38	44.0	1.4552	Ice cream, vanilla; below standard; no sign; sale illegal.
15220	12.97	44.0	1.4552	Ice cream, chocolate.
15221	13.07	44.0	1.4552	Ice cream, vanilla.
14626	2.92	-----	-----	Imitation ice cream; much below standard; no sign; sale illegal.
14625	2.54	-----	-----	do.
15114	5.06	47.0	1.4573	Ice cream, compound; below standard; sign up; sale legal.
15113	4.68	47.0	1.4573	Ice cream, compound; much below standard; sign up; sale legal.
15115	10.54	45.0	1.4559	Ice cream, vanilla, not an official sample.
14764	5.43	-----	-----	Ice cream, below standard; no sign; sale illegal.
15474	0.47	-----	-----	Imitation ice cream sold as ice cream; no sign; sale illegal.
15246	1.58	50.0	1.4593	Imitation ice cream; adulterated; no sign; sale illegal.
15216	6.80	44.0	1.4552	Ice cream, vanilla; below stanard; no sign; sale was illegal.
15191	5.79	44.0	1.4552	do.
15161	3.00	44.0	1.4552	Ice cream, imitation; much below standard; sign up; sale legal.
15162	2.55	44.0	1.4552	do.
15122	11.10	44.5	1.4556	Ice cream, chocolate.

## RESULTS OF THE EXAMINATION OF ICE CREAM

Laboratory Number	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15121	Ice Cream, Vanilla.....	Henry T. Hicks, Raleigh, N. C....	Henry T. Hicks, Raleigh.....
15247	do.....	Hicks & Hawley, Goldsboro, N. C....	Hicks & Hawley, Goldsboro.....
15248	Ice Cream, Chocolate.....	do.....	do.....
15225	Ice Cream, Vanilla.....	R. H. Jordan Drug Store, Char- N. C.	R. H. Jordan, Charlotte.....
14754	Ice Cream.....	Mono Ice Cream Co., Knoxville, Tenn.	W. C. Carmichael, Asheville.....
15127	Ice Cream, Peach.....	Montauk Ice Cream Co., Norfolk, Va.	W. S. Matthews, Raleigh.....
15126	Ice Cream, Vanilla.....	do.....	do.....
15252	do.....	Peerless Ice Cream Co., Richmond, Va.	M. E. Robinson & Bro., Golds- boro.
15253	Ice Cream, Chocolate.....	do.....	do.....
15165	Ice Cream, Vanilla.....	Purity Ice Cream Co., Richmond, Va.	Five Points Drug Co., Durham.
15141	Ice Cream, Peach.....	do.....	Mallette Drug Co., Raleigh.....
15140	Ice Cream, Vanilla.....	do.....	do.....
15166	Ice Cream, Chocolate.....	do.....	Five Points Drug Co., Durham.
15215	Ice Cream, Caramel.....	do.....	Howard Gardner, Greensboro...
15192	Ice Cream, Vanilla.....	do.....	Reid's Drug Store, Sanford.....
15243	do.....	do.....	E. B. Marston Drug Co., Kinston
15226	Ice Cream, Vanilla.....	Purity Ice Cream Co., Charlotte, N. C.	John S. Blake Drug Co., Char- lotte.
15227	do.....	do.....	J. T. Stowe, Charlotte.....
15249	do.....	Purity Ice Cream Co., Greensboro, N. C.	Goldsboro Drug Co., Goldsboro.
15255	Ice Cream Compound.....	John O. Royall, Goldsboro, N. C....	Williams Drug Store, Goldsboro.
15254	do.....	do.....	do.....
15251	do.....	do.....	John O. Royall, Goldsboro, N. C.
15250	do.....	do.....	do.....
15240	Ice Cream, Vanilla.....	S. C. Sitterson, Kinston, N. C....	Grand Theater, Kinston.....
15241	Ice Cream, Chocolate.....	do.....	S. C. Sitterson, Kinston.....
15242	Ice Cream, Vanilla.....	do.....	do.....
15244	do.....	J. T. Skinner & Sons, Kinston, N. C.	J. T. Skinner & Sons, Kinston...
15245	Ice Cream, Chocolate.....	do.....	do.....
15169	do.....	B. H. Thomas, Durham, N. C....	B. H. Thomas, Durham.....
15112	do.....	Wake Drug Store, Raleigh, N. C....	Wake Drug Store, Raleigh.....
15111	Ice Cream, Vanilla.....	do.....	do.....
15097	do.....	do.....	do.....
15098	Ice Cream, Chocolate.....	do.....	do.....
14763	Ice Cream, Strawberry.....	do.....	do.....
14762	Ice Cream, Vanilla.....	do.....	do.....
15164	do.....	Warren & Bear, Durham, N. C....	C. E. King & Sons, Durham.....
15160	Ice Cream, Peach.....	Waverly Ice Cream Co., Durham...	Main Street Pharmacy, Durham.
15159	Ice Cream, Vanilla.....	do.....	do.....
15168	do.....	do.....	R. Blacknall & Son, Durham...
15095	do.....	White Ice Cream Co., Raleigh, N. C.	White Ice Cream Co., Raleigh...
15096	Ice Cream, Chocolate.....	do.....	do.....
15139	Ice Cream, Vanilla.....	do.....	F. W. Parker Drug Co., Raleigh.
15142	Ice Cream, Peach.....	do.....	J. E. Hamlin, Raleigh.....
14759	Ice Cream, Chocolate.....	do.....	White Ice Cream Co., Raleigh...
14758	Ice Cream, Vanilla.....	do.....	do.....
15163	do.....	do.....	F. W. Woolworth, Durham.....

AND ICE CREAM SUBSTITUTES—*Continued.*

Laboratory Number	Fat, Milk, Per Cent.		Reading Refractometer on Fat, 40° C.	Refractive Index	Remarks and Conclusions
15121	8.96	45.0	1.4559		Ice cream, vanilla; slightly below standard.
15247	4.82	44.0	1.4552		Ice cream, much below standard; no sign; sale illegal
15248	4.91	44.5	1.4555		do.
15225	6.38	44.0	1.4552		Ice cream, vanilla; below standard; no sign; sale was illegal.
14754	13.72	-----	-----		Ice cream.
15127	6.82	44.5	1.4556		Ice cream, below standard; no sign; sale illegal.
15126	6.46	44.5	1.4556		do.
15252	9.75	47.0	1.4573		Ice cream, vanilla, slightly below standard; no sign, sale illegal.
15253	9.48	50.0	1.4593		Ice cream, chocolate, slightly below standard, no sign; sale illegal.
15165	9.22	45.0	1.4559		Ice cream, vanilla; slightly below standard.
15141	7.09	44.5	1.4556		Ice cream, peach; below standard; no sign; sale illegal.
15140	9.20	44.5	1.4556		Ice cream, slightly below standard.
15166	9.21	44.5	1.4556		do.
15215	9.44	44.0	1.4552		do.
15192	9.66	44.0	1.4552		do.
15243	9.50	48.0	1.4580		Ice cream, vanilla; slightly below standard; no sign; sale illegal.
15226	6.98	44.0	1.4552		Ice cream, vanilla; below standard; no sign; sale illegal.
15227	4.75	44.0	1.4552		Ice cream, vanilla; much below standard; no sign; sale illegal.
15249	6.71	44.5	1.4555		Ice cream, vanilla; below standard; no sign; sale illegal.
15255	3.61	44.0	1.4552		Ice cream, compound; much below standard; sign up; sale legal
15254	3.45	44.5	1.4555		do.
15251	3.63	44.5	1.4555		do.
15250	4.65	44.0	1.4552		do.
15240	10.39	44.0	1.4552		Ice cream, vanilla.
15241	10.51	44.0	1.4552		Ice cream, chocolate.
15242	10.76	44.0	1.4552		Ice cream, vanilla.
15244	6.45	44.5	1.4555		Ice cream, below standard; no sign; sale illegal.
15245	5.98	45.0	1.4559		do.
15169	9.28	45.0	1.4559		Ice cream, chocolate; slightly below standard.
15112	9.80	47.0	1.4573		Ice cream, slightly below standard.
15111	9.00	45.0	1.4559		do.
15097	9.34	45.0	1.4559		do.
15098	10.14	45.0	1.4559		Ice cream, chocolate.
14763	12.73	-----	-----		Ice cream, strawberry.
14762	12.46	-----	-----		Ice cream, vanilla.
15164	8.82	44.0	1.4552		Ice cream, vanilla; slightly below standard.
15160	12.30	44.0	1.4552		Ice cream, peach.
15159	10.89	44.0	1.4552		Ice cream, vanilla.
15168	10.48	44.5	1.4556		do.
15095	4.15	46.0	1.4566		Ice cream, much below standard; sign up; sale legal.
15096	4.69	46.0	1.4566		do.
15139	4.85	44.5	1.4556		Ice cream, much below standard; no sign; sale illegal.
15142	5.13	44.5	1.4556		do.
14759	5.24	-----	-----		do.
14758	5.49	-----	-----		do.
15163	5.82	44.0	1.4552		do.

## LARD AND COMPOUND LARD

## DEFINITIONS AND STANDARDS.

1. *Lard* is the rendered fresh fat from hogs in good health at the time of slaughter, is clean, free from rancidity, and contains, necessarily incorporated in the process of rendering, not more than one (1) per cent of substances, other than fatty acids and fat.

2. *Leaf lard* is lard rendered at moderately high temperatures from the internal fat of the abdomen of the hog, excluding that adherent to the intestines, and has an iodine number not greater than sixty (60).

3. *Neutral lard* is lard rendered at low temperatures.

## RESULTS OF THE EXAMINATION OF LARD AND

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15206	Lard.....	Lard.....	Armour & Co., Richmond, Va..	C. R. L. Matthews, Rocky Mount.
15205	Lard, Compound, Crispwhite.	Lard, Imitation..	Capital Refining Co., Wash- ington, D. C.	Madison Grocery Co., Madison.
15199	Lard, Rose Brand	Lard .....	Cleveland Provision Co., Clevel- land, O.	E. E. Rouse & Co., La Grange.
15207	.....	do.....	.....	Cuthrell & Sons, Rocky Mount.
15210	.....	do.....	Wm. Focke's Sons Co., Dayton, Ohio.	C. G. Evans, Weldon.....
15209	Lard, Compound, Ladina.	Lard, Compound	W. S. Forbes & Co., Richmond, Va.	L. J. Moore, Weldon.....
15208	do.....	Lard.....	do.....	D. C. Bell, Halifax.....
15213	Lard, Compound, Scoco.	Lard, Compound	.....	J. B. Ingle, Asheville.....
15202	Pure Lard, Oleo Stearin added, Ensign Brand.	Lard.....	Chas. G. Kriel, Baltimore, Md..	H. C. Armstrong, New Bern.
15212	Flakewhite.....	Lard.....	Proctor & Gamble Co., Cin- cinnati, O.	C. G. Hight, Franklinton..
15204	do.....	do.....	do.....	Cook & Harris, Concord...
15200	Compound Lard, Invincible.	Lard, Compound	Proctor & Gamble Co., Macon, Ga.	E. E. Rouse & Co., La Grange.
15211	Scoco.....	Lard.....	Southern Cotton Oil Co., Sa- vannah, Ga.	J. T. Sizemore, Oxford....
15201	Lard, Victory Brand.	do.....	Chas. Sucher Packing Co., Dayton, O.	E. S. Mewborn, La Grange.
15214	.....	Lard, Compound	.....	J. E. Webb, Shelby.....



There is no standard for compound lard, it being a mixture or compound of fats, but as found on the market it is usually cotton-seed oil with enough beef stearin (oleostearin) to give it the requisite degree of solidity or consistence and a small amount of real lard. Lard stearin or cotton-seed stearin may be used in place of the beef stearin.

The compound lards or lard substitutes are usually properly labeled what they are, but many dealers selling them at retail from bulk sell them as lard. The sale of compound lard is all right, provided it is sold as compound lard, but the sale of it as lard is a violation of the law.

The results of the examination of the fifteen samples examined during the year are published in the table below.

## COMPOUND LARD OR LARD SUBSTITUTES.

Laboratory Number	Halphen's Test for Cotton-seed Oil	Reading Refractometer, 40° C.	Refractive Index	Iodine Number (Hanus)	Remarks and Conclusions
15206	Negative...	50.5	1.4597	60.0	Lard.
15205	Positive ....	61.0	1.4665	91.4	Compound lard.
15199	Negative...	51.5	1.4603	54.9	Lard.
15207	Positive ....	59.5	1.4656	93.7	Compound lard, sold as lard; misrepresented; sale illegal.
15210	Negative...	50.0	1.4593	57.9	Lard.
15209	Positive ....	59.5	1.4656	91.6	Compound lard.
15208	....do.....	61.0	1.4665	92.4	Compound lard, branded compound on tub. Dealer sold it as lard; misrepresented; sale illegal.
15213	....do.....	58.0	1.4646	92.6	Compound lard.
15202	Negative...	52.0	1.4607	49.6	Lard compound, misbranded: sale illegal.
15212	Positive ....	59.0	1.4652	89.8	Compound lard, sold as lard; misrepresented; sale was illegal.
15204	....do.....	59.0	1.4652	96.1	do.
15200	....do.....	61.0	1.4665	94.1	Compound lard.
15211	....do.....	59.0	1.4652	98.6	Compound lard, sold as lard; misrepresented; sale was illegal
15201	Negative...	51.0	1.4600	54.4	Lard.
15214	Positive ....	59.0	1.4652	89.2	Compound lard.

## LEMON EXTRACTS AND LEMON EXTRACT SUBSTITUTES

## DEFINITIONS AND STANDARDS.

Lemon extract is the flavoring extract prepared from oil of lemon, or from lemon peel, or both, and contains not less than 5 per cent by volume of oil of lemon.

Oil of lemon is the volatile oil obtained from the fresh peel of the lemon.

Terpeneless extract of lemon is the flavoring extract prepared by shaking oil of lemon with dilute alcohol, or by dissolving terpeneless oil of lemon in dilute alcohol, and contains not less than two-tenths (0.2) per cent by weight of citral, derived from oil of lemon.

Compound lemon extract is the flavoring product containing more than 50 per cent of lemon extract with some other flavoring as a substitute for lemon, such as citral, etc.

Imitation lemon extract is a flavoring product made from citral or other substitutes for lemon oil, and contains little or no lemon oil.

## RESULTS OF THE EXAMINATION OF LEMON

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14635	Lemon Extract.....	Ahrens Bros., Wilmington, N. C.	E. E. Russ, Wilmington.....
14643	Lemon Extract Flavoring, Monarch, Concentrated.	Austin-Nichols & Co., New York, N. Y.	E. B. Hackburn, New Bern.....
14641	Lemon Substitute, Brunswick.	.....do.....	C. D. Jones Co., Beaufort.....
14742	Lemon Extract.....	W. E. Beavans, Enfield, N. C.	W. E. Beavans, Enfield.....
14634	.....do.....	Robt. R. Bellamy, Wilmington, N. C.	M. J. Schulken, Wilmington.....
15047	Lemon Substitute, Snow Cap.	The Blue Ridge Tea Co., Asheville, N. C.	The Blue Ridge Tea Co., Asheville.
14644	Lemon Extract, Peacock.	Bristol Drug Mfg. Co., Bristol, Tenn.-Va.	D. M. Roberts & Co., New Bern.
14631	Lemon Extract, Terpeneless, C. P. C. Brand.	California Perfume Co., New York, N. Y.	Russell-Gillies Co., Laurinburg..
14745	Lemon Flavor, Melvin's Concentrated.	Carr, Owens & Co., Baltimore, Md.	J. C. Moore & Bros. Co., Whiteakers.
15051	Extract Lemon, Chamberlain's.	Chamberlain Medicine Co., Des Moines, Ia.	J. E. Webb, Shelby.....
14637	Lemon Extract.....	Chestnut Drug Co., Clinton, N. C.	Aman Grocery Co., Clinton.....
15054	Lemon Extract, Terpeneless, St. Elmo.	Chickamauga Mfg. Co., Chattanooga, Tenn.	McRae Grocery Co., Rockingham.
14645	Lemon Substitute, Regal, Contains Oil of Lemon.	Clark, Chapin & Bushnell, New York, N. Y.	Walter Credle Co., Washington..
14639	Lemon Extract, C. C. C. Brand.	Clotworthy Chemical Co., Baltimore, Md.	J. W. Cole, Goldsboro.....
14638	.....do.....	.....do.....	.....do.....
15044	Lemon Extract, Windsor.	Cumberland Mfg. Co., Nashville, Tenn.	W. P. Young & Co., Spencer.....

Substitutes for lemon extract are usually of very little value as a flavoring material; but if properly labeled or branded just what they are, their sale is legal, provided they contain nothing deleterious to health, such as wood alcohol, etc. Wood alcohol is a dangerous poison. A small amount is liable to produce death, and even a smaller amount may produce total and permanent blindness.

There are many imitations and compounds used as substitutes for lemon extract. They depend largely on citral, one of the constituents of lemon oil, for their flavoring principal, and while citral is a constituent of lemon oil, it is also obtained from other sources, like lemon grass.

The sale of these substitutes for lemon extract is all right, provided they are properly labeled and sold for what they are, but they are not lemon extracts, and are not as good as lemon extract, and must not be sold as lemon extracts.

The results of the examinations of forty-three samples under this head are reported in the table below, to which attention is called.

## EXTRACTS AND LEMON EXTRACT SUBSTITUTES.

Laboratory Number	Oil of Lemon by Polarization—Per Cent by Volume	Oil of Lemon by Precipitation—Per Cent by Volume	Reading Refractometer on Oil, 15.5° C.	Refractive Index of Oil	Specific Gravity, 15.5° C.	Alcohol (by Volume), Per Cent	Remarks and Conclusions
14635	5.10	4.80	76.0	1.4760	0.82865	86.57	Lemon extract.
14643	-----	6.00	76.0	1.4760	0.83778	82.83	Lemon extract; not highly concentrated as labeled; misbranded; sale illegal.
14641	0.00	0.00	-----	-----	0.97613	20.15	Imitation lemon extract.
14742	5.40	5.40	76.0	1.4760	0.82302	87.83	Lemon extract.
14634	-----	5.60	76.0	1.4760	0.82094	88.17	do.
15047	0.00	00.0	-----	-----	0.94111	46.53	Imitation Lemon extract.
14644	5.00	4.80	76.0	1.4760	0.95497	78.25	Lemon extract.
14631	0.60	0.50	76.0	1.4760	0.91367	59.16	Terpeneless lemon extract.
14745	6.20	6.10	76.0	1.4760	0.85189	78.21	Lemon extract.
15051	-----	6.20	75.0	1.4753	0.84176	81.42	do.
14637	-----	0.00	-----	-----	0.94958	41.53	Imitation lemon extract, branded extract of lemon; misbranded; sale illegal.
15054	0.00	0.00	-----	-----	0.91282	60.16	Terpeneless lemon extract.
14645	0.00	0.00	-----	-----	0.95248	39.81	Imitation lemon extract; contains no oil of lemon; misbranded; sale illegal.
14639	5.40	5.40	76.0	1.4760	0.82846	86.20	Lemon extract.
14638	6.00	5.90	76.0	1.4760	0.82833	85.66	do.
15044	5.60	5.30	75.0	1.4753	0.83712	83.75	do.

## RESULTS OF THE EXAMINATION OF LEMON EXTRACTS

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14743	Lemon Extract, Yours Truly.	Geo. S. Edwards & Co., Rocky Mount, N. C.	F. H. Hutchins, Whitakers.....
15045	Lemon Flavor, Citral and Terpeneless Lemon, Our Own.	H. C. Gaither, Statesville, N. C.	H. C. Gaither, Statesville.....
15049	Lemon Extract, Tower....	Gilbert Bros. & Co., Baltimore, Md.	T. M. Cogburn & Bro., Canton..
14627	Lemon Extract, Gilbert's Select.	do.....	C. B. Keech & Co., Tarboro....
14628	Lemon Extract, Concentrated.	S. J. Highsmith, Rocky Mount, N. C.	F. Y. Arrington, Rocky Mount..
15053	Lemon Extract.....	Hornet's Nest Liniment Co., Charlotte, N. C.	L. B. Rogers, Charlotte.....
14744	Lemon Extract, Terpeneless, Old Dominion.	Interstate Commerce Co., Richmond, Va.	Geo. J. Hales Co., Whitakers....
14747	Lemon, Keystone Brand..	Keystone Drug Co., South Boston, Va.	Southern Grocery Co., Henderson.
14649	Lemon Flavor, Imitation.	J. J. Lamkin, Baltimore, Md.	D. R. Morgan & Co., Elizabeth City.
15050	Extract of Lemon, Terpeneless, Bear Brand.	The Lewis Bear Drug Co., Montgomery, Ala.	T. I. Hughes, Bryson City.....
14629	Lemon Extract, Bee Brand	McCormick & Co., Baltimore, Md.	N. C. Phillips & Co., Maxton....
14642	Lemon Substitute, High Proof, contains Oil of Lemon.	Miller Mfg. Co., New York, N. Y.	E. B. Hackburn, New Bern.....
14640	Lemon Extract, Imitation, Delta.	Newton Tea and Spice Co., Cincinnati, Ohio.	T. B. Holloway, Kinston.....
15043	Lemon Flavoring, N. P. D. Brand.	Norman-Perry Drug Co., Winston-Salem, N. C.	I. A. Morris & Bro., High Point..
14630	Lemon Flavor, Imitation, Hygienic Pet.	Overton-Hygienic Co., Chicago, Ill.	M. L. McRae, Maxton.....
14636	Lemon Extract.....	Owens & Minor Co., Richmond, Va.	B. F. Powell, Clinton.....
14646	Lemon Extract, Peregay's Superior.	Peregay & Co., Baltimore, Md.	Sawyer Grocery Co., Belhaven..
14746	Lemon Extract, Terpeneless, Ropo.	Roper & Co., Petersburg, Pa.	W. A. Harris, Littleton.....
14633	Lemon Extract, Scotts....	John M. Scott & Co., Charlotte, N. C.	J. H. Wishart, Lumberton.....
15046	Lemon Flavor.....	Dr. T. C. Smith, Asheville, N. C.	J. B. Ingle, Charlotte.....
14748	Lemon Extract, Golden Seal.	Southern Grocery Co., Henderson, N. C.	Southern Grocery Co., Henderson.
15048	Lemon Extract, Ferndell.	Sprague-Warner & Co., Chicago, Ill.	E. C. Jarrett, Asheville.....
14647	Essence of Lemon.....	Standard Drug Co., Elizabeth City, N. C.	F. G. Terrell, Belhaven.....
14650	do.....	do.....	W. T. Williams, Elizabeth City..
14632	Lemon Extract, Our Seal.	Vaughn-Crutchfield Co., Winston-Salem, N. C.	D. J. McDuffie, Laurinburg.....
15052	Lemon Extract, Webb's...	Webb Mfg. Co., Nashville, Tenn.	Briscoe & Hamilton, Rutherfordton.
14648	Lemon Extract.....	Williams, Martin & Gray, Norfolk, Va.	White & Co., Hertford.....

AND LEMON EXTRACT SUBSTITUTES—*Continued.*

Laboratory Number	Oil of Lemon by Polarization—Per Cent by Volume	Oil of Lemon by Precipitation—Per Cent by Volume	Reading Refractometer on Oil, 15.5° C.	Refractive Index of Oil	Specific Gravity, 15.5° C.	Alcohol (by Volume), Per Cent	Remarks and Conclusions
14743	7.20	7.00	76.0	1.4759	0.82695	85.06	Lemon extract.
15045	0.00	0.00	-----	-----	0.97241	23.68	Compound lemon extract.
15049	-----	5.20	75.0	1.4753	0.84890	80.09	Lemon extract.
14627	-----	12.40	76.0	1.4760	0.82464	80.37	Lemon extract, concentrated.
14628	0.00	0.00	-----	-----	0.95961	-----	Imitation lemon extract, branded lemon extract; misbranded; sale illegal.
15053	1.60	1.70	75.0	1.4753	0.89439	66.47	Lemon extract, below standard; adulterated; sale illegal.
14744	0.00	0.00	-----	-----	0.93805	48.18	Terpeneless lemon extract.
14747	0.00	0.00	-----	-----	0.94465	44.40	Imitation lemon extract; branded "Ketstone Brand Lemon"; misbranded; sale illegal.
14649	0.00	0.00	-----	-----	0.97159	24.48	Imitation lemon extract.
15050	0.00	0.00	-----	-----	0.91118	60.89	Terpeneless lemon extract.
14629	7.60	7.40	76.0	1.4760	0.84753	78.27	Lemon extract.
14642	0.00	0.00	-----	-----	0.95704	36.70	Imitation lemon extract; contains no oil of lemon; misbranded; sale illegal.
14640	0.00	0.00	-----	-----	0.96233	32.73	Imitation lemon extract.
15043	-----	4.40	75.0	1.4753	0.84398	82.54	Lemon extract, below standard, adulterated; sale illegal.
14630	0.00	0.00	-----	-----	0.97192	19.19	Imitation lemon extract.
14636	4.80	4.60	76.0	1.4760	0.83966	83.58	Lemon extract, below standard; sale illegal.
14646	0.00	0.00	-----	-----	0.94239	45.77	Imitation lemon extract and not superior lemon extract as branded; misbranded; sale illegal.
14746	0.00	0.01	-----	-----	0.93595	49.32	Terpeneless lemon extract.
14633	5.30	5.20	76.0	1.4760	0.84852	80.22	Lemon extract.
15046	5.40	5.40	75.0	1.4753	0.81802	89.11	Lemon extract.
14748	1.90	1.90	76.0	1.4759	0.88659	69.46	Lemon extract, below standard; adulterated and misbranded; sale illegal.
15048	10.60	10.60	75.0	1.4753	0.83224	79.92	Lemon extract, concentrated.
14647	5.40	5.20	76.0	1.4760	0.82678	86.92	Lemon extract.
14650	5.00	4.80	76.0	1.4760	0.82036	88.90	Lemon extract.
14632	5.00	4.80	76.0	1.4760	0.84294	82.27	Lemon extract.
15052	5.30	5.00	75.0	1.4753	0.84408	81.60	Lemon extract.
14648	5.00	4.50	76.0	1.4760	0.81745	89.64	Lemon extract.

## MAPLE SIRUP SUBSTITUTES

### DEFINITIONS AND STANDARDS.

Sirup is the sound product made by purifying and evaporating the juice of a sugar-producing plant without removing any of the sugar.

Maple sirup is sirup made by the evaporation of maple sap or by the solution of maple concrete, and contains not more than 32 per cent of water and not less than 0.45 per cent of maple sirup ash.

Before the food laws were passed and enforced these blended sirups were labeled and sold as maple sirups. The tendency now is to misbrand

### RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14591	Table Sirup, Standard Brand.	Sirup, Compound	The American Preserve Co., Philadelphia, Pa.	H. A. Powell Grocery Co., Goldsboro.
14592	do.	Table Sirup.	do.	Geo. E. Daniels, Goldsboro.
14586	Sirup, Cane and Maple Sugar, Old Time.	Sirup, Compound	J. H. Baker & Co., New York, N. Y.	H. O. Mattox, Dunn.
14589	Sirup, Cane and Maple Sugar.		Huntington Maple Sirup and Sugar Co., Providence, R. I.	E. T. Joyner, Rocky Mount.
14590	Sirup, Cane and Maple Verhampshire.	Cane and Maple Sirup.	C. M. Tice & Co., Boston, Mass.	J. H. Wishart, Lumberton.
14587	Sirup, Towles Log Cabin, Compound.	Sirup Compound,	Towles' Maple Products Co., St. Johnsbury, Vt.	Gaston G. Levy & Bro., Rocky Mount.
14588	Sirup, Towle's Great Mountain, Compound.	do.	do.	E. T. Joyner, Rocky Mount.
14593	Cane and Maple Sirup, Mayflower Brand.	Cane and Maple Sirup.	Welch Bros. Maple Co., Burlington, Vt.	C. V. McGehee, New Bern.

## MILK AND CREAM

### DEFINITIONS AND STANDARDS.

Milk is the fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows properly fed and kept, excluding that obtained within fifteen days before and ten days after calving, and contains not less than eight and one-half (8.5) per cent of solids not fat, and not less than three and one-quarter (3.25) per cent of milk fat.

Blended milk is milk modified in its composition so as to have a definite and stated percentage of one or more of its constituents.

them by labeling them cane and maple sirup when only a small amount of maple sirup is present. For a product to be cane and maple sirup, and have the right to be so labeled, it must contain an appreciable amount of both substances named, and the name of the one in excess should come first on the label.

If products of this kind are labeled or branded so as to mislead any purchaser, the Department will regard them as misbranded and their sale illegal.

For results of examination of samples made during the year, see table below.

#### BLENDED SIRUPS—CANE AND MAPLE.

Laboratory Number	Total Solids—Per Cent	Total Ash—Per Cent	Insoluble Ash—Per Cent	Soluble Ash—Per Cent	Alkalinity of Soluble Ash, C.C., N-10HCl.	Polarization, Direct, 20° C. %V.	Polarization, Invert, 20° C. %V.	Sucrose (Clerget)	Glucose (Leach's Formula)	Lead Number	Water	Remarks and Conclusion
14591	68.39	0.11	0.05	0.06	12.0	61.0	—20.9	61.73	None	0.17	31.61	Sirup, cane, containing small amount of maple sirup.
14592	68.39	0.12	0.05	0.07	12.0	61.0	—20.9	61.73	do.	0.22	31.61	do.
14586	68.09	0.09	0.05	0.04	12.0	64.0	—20.9	64.00	do.	0.14	31.91	do.
14589	67.24	0.06	0.03	0.06	12.0	47.0	—20.9	51.18	do.	0.12	32.76	Sirup, containing a small amount of maple sirup.
14590	67.24	0.27	0.07	0.20	24.0	59.0	—20.9	60.22	do.	0.31	32.76	Sirup, cane, containing maple sirup.
14587	66.39	0.11	0.05	0.06	14.0	61.0	—20.9	61.73	do.	0.14	33.61	Sirup, containing a small amount of maple sirup.
14588	66.39	0.06	0.03	0.03	12.0	64.0	—20.9	64.00	do.	0.11	33.61	do.
14593	68.39	0.18	0.08	0.10	16.0	60.4	—20.9	61.27	do.	0.45	31.61	Sirup, cane and maple.

Skim-milk is milk from which a part or all of the cream has been removed, and contains not less than nine and one-quarter (9.25) per cent of milk solids.

Cream is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean, and contains not less than eighteen (18) per cent of milk fat.

The Food Law provides that a food product shall be deemed to be adulterated—

If any substance has been mixed or packed with it so as to reduce or lower or injuriously affect its quality or strength;

If its strength or purity falls below the standards that have been adopted by the Board of Agriculture.

No official samples under this head have been examined during the

#### RESULTS OF THE EXAMINA

Laboratory Number	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14750 Cream.....			H. T. Hicks Co., Raleigh.....
15717 Milk.....		Jeffries' Dairy, Raleigh, N. C.....	Jeffries' Dairy, Raleigh.....
15092 ....do.....			R. L. Phillips, Rockingham.....
14995 ....do.....		Mrs. Templeton, Cary, N. C.....	A. Dughi, Raleigh.....
15055 Milk, Human.....			J. H. Vanderford, Snow Hill.....
15116 Cream.....		R. E. L. Yates, Raleigh, N. C.....	H. T. Hicks Co., Raleigh.....

#### MISCELLANEOUS SAMPLES

Six samples sent to the Department for analysis, being only one of

#### RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler
14432	Hash, Alfaco Southern Style, Home-made.	Hash.....	Acme Packing Co., Chicago, Ill. ....
14767	Ice Cream Powder.....		
14421	Apple Sauce, Secco.....	Apple Sauce.....	S. E. Comstock & Co., Newark, N. J. ...
14667	Chocolate Candy.....		
14579	Peaches, Canned.....		
14423	Powdered Alum.....		

#### MOLASSES AND SIRUPS

##### DEFINITIONS AND STANDARDS.

Sirup is the sound product made by purifying and evaporating the juice of a sugar-producing plant without removing any of the sugar.

Sugar-cane sirup is sirup made by the evaporation of the juice of the sugar-cane, or by the solution of sugar-cane concrete.

Sorghum sirup is sirup made by the evaporation of sorghum juice or by the solution of sorghum concrete.

Refiners' sirup is the residual liquid product obtained in the process of refining raw sugar.



year, the samples examined having been sent to the Department for analysis.

Attention is called to the standard for fat in cream. Cream contains not less than 18 per cent of milk fat.

#### TION OF MILK AND CREAM.

Laboratory Number	Fat, Milk— Per Cent	Solids— Per Cent	Remarks and Conclusions
14750	16.80		Cream below standard in milk fat.
15717	5.07	11.97	Milk.
15092	3.40		do.
14905	4.19		do.
15055	1.40	9.49	Milk, human, somewhat below normal in total solids, especially fat.
15116	16.58		Cream below standard in milk fat; sale illegal.

each kind, are grouped under the head of "Miscellaneous Samples." The conclusions drawn from the results of the analyses are published in the table below.

#### OF MISCELLANEOUS SAMPLES.

Laboratory Number	Retail Dealer or Party Who Sent Sample for Analysis	Remarks and Conclusions
14132	Robertson Grocery Co., Salisbury, N. C.	Hash which contains starch of some kind.
14767	Candy Kitchen, Mount Airy.	Cream of tartar.
14421	Thomas & Howard Co., Greensboro.	Apple sauce; contains no sulphur.
14667	W. A. Green, Selma.	Chocolate candy, tested for arsenic and strychnine, none found.
14579	Miss Margaret Scott, Raleigh.	Peaches, canned; in bad condition.
14423	E. W. Tatum, Salisbury, N. C.	Sodium carbonate, containing small amount potassium carbonate.

Molasses is the product after separating the sugar from massecuite, melada, mush sugar, or concrete.

Molasses or sirup that is compounded or mixed with glucose or any other substance to cheapen or lower its quality must be labeled so as to plainly indicate what the product is. That is, a mixture of molasses and corn sirup, with the molasses in excess, would be properly labeled molasses and corn sirup. If the corn sirup is in excess, it should be labeled corn sirup and molasses. Corn sirup containing a small amount of cane sirup should be labeled so as to plainly indicate the facts in the case.

A label, "Corn and Cane Sirup," is not, in our judgment, a proper label for a product composed largely of corn sirup containing a small amount of cane sirup. A product so labeled should contain a material amount of the cane sirup.

Refiners' sirup is not cane sirup, and cannot be legally sold as such. Neither would a mixture of corn sirup and refiners' sirup be properly labeled if labeled corn and cane sirup. It should be labeled corn and refiners' sirup or compound sirup.

Molasses and sirups seem to be much adulterated and misbranded. Some manufacturers are disposed to hide the truth in regard to the real character of compound sirups, while others label them plainly what they are, as will be seen by reference to the table below; but the greater number of violations in the sale of this class of products are committed by the retail dealers. They buy the products in bulk, labeled compound or with the name of the ingredients on the label, showing that it is a

## RESULTS OF THE EXAMINATION OF MOLAS

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14679	Sirup, Alaga, Cane Sirup, Com- and Corn Com- pound.	Compound.	Alabama-Georgia Sirup Co., Montgomery, Ala.	H. C. Joyner, Rocky Mount.
14318	Katrena, Ribbon Cane Sirup.	Sirup, Cane	do.	A. S. Melvin Co., Fayetteville.
14337	Alaga, Cane and Compound Sirup Corn Com- pound.	Compound Sirup	do.	Gaston G. Levy & Bro., Rocky Mount.
14956	Sirup, Sunny Gold, Corn and Cane.	do.	do.	City Grocery, Gastonia.
14959	Katrena, Ribbon Cane Sirup.	Sirup	do.	A. P. Pastom, Shelby.
14469	-----	Molasses.	-----	J. W. Alphen, Mt. Olive.
14477	-----	Sirup, Corn.	American Preserving Co., Philadelphia, Pa.	E. M. Davis Grocery Co., Goldsboro.
14960	Tennessee Brand, Sirup, Com- Corn Sirup, Pure Country Sorghum Compound.	Compound.	American Sirup and Preserving Co., Nashville, Tenn.	M. A. McSwain & Son, Shelby.
14936	Crystal Domino, Sirup, Cane. Pure Cane Sugar Sirup.	Sirup, Cane	American Sugar Refining Co., Jersey City, N. J.	J. E. Woolen, High Point.
14436	-----	Molasses.	C. W. Antrim & Sons, Richmond, Va.	J. F. Morgan, Sanford.
14437	-----	do.	do.	Lee Store Co., Sanford.
14438	Mayfield, Com- pound Molasses and Corn Sirup.	Molasses, Com- pound.	do.	W. T. Buchanan, Sanford.
14439	-----	Molasses.	do.	do.
14441	-----	do.	do.	Sanford Supply Co., Sanford.

compound, and then they proceed to sell it as a pure product. Some of these products are labeled corn and cane sirup, which label would appear to indicate about equal parts of each ingredient, when as a fact it is corn sirup or glucose flavored with or containing a small amount of cane sirup. Manufacturers often use the term cane sirup when the product is not cane sirup, but is refiners' sirup instead. They also label some of these compound sirups "Table Sirup." If a product contains corn sirup, glucose, or any other substance except one made from the juice of a sugar-producing plant without removing any of the sugar, it is not a pure, true sirup, and cannot be properly labeled table sirup. Such products must be sold as compound sirup, refiners' sirup, or corn sirup, as the case may be.

The sale of compound sirups or compound molasses is all right, provided they are sold for what they are—compounds, but they can not be sold simply as molasses or as sirup.

#### SES AND SIRUPS AND COMPOUNDS OF SAME.

Laboratory Number	Polarization, Direct, 20° C. °V.	Polarization, Invert, 20° C. °V.	Sucrose (Clerget) — Per Cent	Glucose, Com- mercial (Leach's Formula) — Per Cent	Solid Matter — Per Cent	Water — Per Cent	Remarks and Conclusions
14679	97.0	55.0	31.67	37.33	72.00	28.00	Compound sirup.
14318	48.0	-22.0	52.76	0.00	72.56	27.44	Cane sirup.
14337	90.0	52.8	28.04	34.83	72.24	27.76	Compound corn and cane sirup.
14956	104.0	74.8	22.00	46.85	71.24	28.76	do.
14959	55.0	-22.0	58.04	0.00	72.30	27.70	Sirup.
14469	40.0	-13.2	40.10	0.00	71.14	28.86	Molasses.
14477	144.0	114.4	22.31	69.53	80.96	19.04	Compound sirup.
14960	122.0	107.8	10.70	63.60	72.50	27.50	Compound sirup, containing a small amount of pure sirup.
14936	14.0	-22.0	27.13	0.00	79.58	20.42	Sirup, composed largely of invert sugar.
14436	36.0	-17.6	40.40	0.00	73.46	26.54	Molasses.
14437	42.0	-18.7	45.75	0.00	76.38	23.62	do.
14438	111.0	88.0	17.33	53.52	75.32	24.68	Compound sirup and molasses and not molasses and corn sirup.
14439	46.0	-15.4	46.28	0.00	71.46	28.54	Molasses.
14441	44.0	-17.6	46.43	0.00	72.34	27.66	do.

## RESULTS OF THE EXAMINATION OF MOLASSES

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14488	-----	Molasses	Armstrong Grocery Co., New Bern, N. C.	J. C. Helms, Morehead City
14335	-----	do	-----	F. Y. Arrington, Rocky Mount.
14341	Corn Sirup and Honey.	Corn Sirup and Honey.	Atlas Preserving Co., Baltimore, Md.	J. D. Williams, Wilson...
14342	Ginger Flavored Table Sirup.	Sirup, Com-pound.	do	do
14348	Corn Sirup and Honey.	Corn Sirup and Honey.	do	Drake & Cobb, Wilson...
14434	Sunbeam, Fancy Sugar Sirup.	Sirup, Sugar	Austin, Nichols & Co., New York, N. Y.	The Home Store, Southern Pines.
14484	Mariana, Sugar House Molasses.	Molasses	Bousquet-Jordan Co., Orleans, La.	E. A. Walters, LaGrange...
14490	-----	do	E. K. Bishop & Co., New Bern, N. C.	J. B. Jones & Son, Beaufort
14499	-----	Sirup	-----	J. T. Bishop, Belhaven...
14685	-----	Molasses	Blackman, Morris Co., Orleans, La.	H. G. Dickens, Weldon...
14327	-----	Sirup, Breakfast	W. B. Blakely & Co., Winston-Salem, N. C.	J. H. Weisner & Co., Winston-Salem.
14505	-----	Sirup	-----	W. S. Blanchard & Son, Hertford.
14950	Silver Drip, Corn Sirup, Sweetened with Sugar	Sirup, Com-pound	Blue Ridge Grocery Co., Asheville, N. C.	W. L. Barnett, Asheville...
14461	-----	Molasses	-----	E. S. Bannerman, Wilmington.
14684	-----	do	A. Brinkley & Co., Norfolk, Va.	S. A. Richards, Halifax...
14506	-----	Sirup	-----	Brinning Mfg. Co. Store, Edenton
14462	-----	do	-----	C. S. Britt, Wilmington...
14507	-----	do	-----	W. R. Brothers, Edenton...
14503	-----	do	-----	J. Broughton & Bro., Hertford.
14472	-----	do	-----	J. W. Byrd, Mt. Olive...
14470	-----	Molasses	-----	Byrd & Bell, Mt. Olive...
14460	-----	Sirup	-----	B. B. Bryan & Co., Wilmington.
14453	-----	Molasses	-----	L. H. Caldwell, Lumberton,
14958	-----	Sirup	-----	R. E. Campbell, Shelby...
14961	Rosalie, Molasses and Corn Sirup.	Molasses and Corn Sirup.	Columbia Coffee Mills, Orleans, La.	Rhyne Bros., Charlotte...
14689	-----	Molasses	C. C. Covington Co., Winston, N. C.	Geo. E. Perry, Henderson...
14935	-----	do	do	Allred Bros., High Point...
14947	-----	do	do	Harrison & Co., Lenoir...
14447	-----	do	do	G. W. Goodwyn, Laurinburg.
14450	-----	do	do	Lackey Bros., Hamlet...
14467	-----	do	-----	J. B. Cox, Warsaw...
14486	-----	Sirup	-----	E. A. Dawson, Kinston...

AND SIRUPS AND COMPOUNDS OF SAME—*Continued.*

Laboratory Number	Polarization, Direct, 20° C. °V.	Polarization, Invert, 20° C. °V.	Sucrose (Clerget), Per Cent	Glucose, Com- mercial (Leach's Formula)—Per Cent	Solid Matter— Per Cent	Water—Per Cent	Remarks and Conclusions
14488	40.0	—13.2	40.10	0.00	72.32	27.68	Molasses.
14335	41.0	—15.4	42.51	0.00	73.08	26.92	do.
14341	155.5	155.5	0.00	88.85	80.00	20.00	Corn sirup flavored with honey; misbranded; sale illegal.
14342	164.0	157.3	5.05	90.82	81.00	19.00	Corn sirup, cane flavor; misbranded; sale illegal.
14348	147.0	147.0	0.00	85.00	76.74	23.26	Corn sirup, honey flavor; misbranded; sale illegal.
14434	10.0	—13.2	17.48	0.00	79.82	20.18	Sirup, composed largely of invert sugar.
14484	25.0	— 8.8	25.47	0.00	70.70	29.30	Molasses.
14490	40.0	—17.6	43.41	0.00	73.82	26.18	do.
14499	114.0	77.0	27.89	49.20	77.64	22.36	Compound sirup; sold as sirup; misrepresented; sale illegal.
14685	29.0	—15.4	13.46	0.00	77.54	22.46	Molasses.
14327	4.0	—25.3	22.08	-----	83.34	16.66	Sirup, slight honey flavor; misbranded; sale illegal.
14505	100.0	74.8	19.00	46.28	77.34	22.66	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14950	164.0	160.4	2.71	94.87	75.64	24.36	Compound sirup, branded white sirup; misbranded sale illegal.
14461	40.0	—17.6	43.41	0.00	76.92	23.08	Molasses.
14684	38.0	—13.2	38.60	0.00	75.23	24.77	do.
14506	100.0	74.8	19.00	46.28	78.08	21.92	Compound sirup, sold as sirup; misrepresented; sale illegal.
14462	90.0	52.8	28.04	35.40	71.68	28.32	do.
14507	100.0	74.8	19.00	46.28	76.40	23.60	do.
14503	100.0	74.8	19.00	46.28	78.92	21.08	do.
14472	128.0	89.3	29.16	56.40	78.80	21.20	do.
14470	24.0	—17.6	31.35	0.00	73.42	26.58	Molasses.
14460	85.0	55.0	22.61	35.65	72.20	27.71	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14455	36.0	—17.6	40.40	0.00	72.36	27.70	Molasses.
14958	26.0	—13.2	29.54	0.00	75.77	24.23	Sirup.
14961	68.0	35.2	24.72	24.73	71.72	28.28	Compound molasses and corn sirup, glucose.
14689	40.0	—15.4	41.76	0.00	73.35	26.65	Molasses.
14935	43.0	—17.6	45.68	0.00	72.77	27.23	do.
14947	42.0	—17.6	44.91	0.00	72.11	27.89	do.
14447	40.0	—17.6	43.41	0.00	74.20	25.80	do.
14450	37.0	—17.6	41.15	0.00	77.80	22.20	do.
14467	40.0	—15.4	41.76	0.00	72.36	27.70	do.
14486	138.4	114.4	17.78	68.70	75.70	24.30	Compound sirup; sold as sirup; misrepresented; sale was illegal.

## RESULTS OF THE EXAMINATION OF MOLASSES

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14349	.....	Molasses.....	.....	Drake & Cobb, Wilson....
14345	King Komus, Pure Louisiana Cane Sirup.	Sirup.....	Dunbar, Lopez & Dukate Co., New Orleans, La.	J. W. Riley, Wilson.....
14323	Corn Sirup and Sugar House Molasses, Vesmar Brand.	Corn Sirup and Sugar House Molasses.	Dunbar Molasses and Sirup Co., New Orleans, La.	Waynick & Turner Co., Greensboro.
14338	Fancy Molasses.....	Molasses.....	Geo. S. Edwards & Co., Rocky Mount, N. C.	Gaston G. Levy, Rocky Mount.
14683	.....	Sirup, Refiners.....	Geo. S. Edwards & Co., Rocky Mount, N. C.	J. C. Moore & Bros. Co., Whitakers.
14682	.....	Molasses.....	do.....	F. H. Cutchin, Whitakers..
14322	Shirley, Corn Syrup, Cane Flavor.	Sirup, Corn.....	Fleming-Christian Co., Richmond, Va.	B. F. Ivie, Leaksville.....
14974	.....	Molasses.....	.....	B. D. Funderburk, Matthews.
14973	.....	do.....	.....	do.....
14972	.....	Sirup.....	.....	do.....
14508	.....	Molasses.....	.....	M. P. Gallop & Co., Elizabeth City.
14681	LaBelle Sirup, Mixture of Corn Sirup and Refiners Sirup.	Sirup, Compound	Gibbs Preserving Co., Baltimore, Md.	W. J. Burgess & Co., Enfield
14954	No. 8, New Orleans Molasses.	Molasses.....	E. J. Gillies & Co., New York, N. Y.	W. M. Lawson, Hot Springs
14481	.....	Sirup.....	J. T. Ginn & Co., Goldsboro..	W. R. Thompson, Goldsboro.
14493	Cane Field Brand, Compound.	Sirup, Compound.	Globe Coffee and Molasses Co., New Orleans, La.	Lucas & Lewis, New Bern.
14440	.....	Sirup.....	.....	O. M. Goodwyn, Sanford
14504	.....	Sirup, Compound	Granby Jobbing Co., Norfolk, Va.	Divers & Roper, Hertford.
14456	.....	Molasses.....	Hall & Pearsall, Wilmington, N. C.	R. D. Caldwell & Son, Lumberton.
14465	.....	Sirup.....	.....	Hall & Ross, Wilmington..
14442	.....	do.....	Hammond & Co., Laurinburg, N. C.	Pace Grocery Co., Maxton.
14688	.....	do.....	.....	C. D. Harton, Henderson..
14445	.....	do.....	Heath-Morrow Co., Monroe, N. C.	L. A. Monroe & Son, Laurinburg.
14977	Louise, Table Sirup.	Sirup, Table.....	do.....	E. B. Liles, Rockingham..
14694	.....	Molasses.....	Henderson Grocery Co., Henderson, N. C.	J. H. Baker, Wake Forest..
14474	.....	Sirup.....	.....	J. G. Hinson, Goldsboro..
14692	.....	Molasses.....	.....	C. G. Hight, Franklinton..

AND SIRUPS AND COMPOUNDS OF SAME—*Continued.*

Laboratory Number	Polarization Direct, 20° C. %V.	Polarization, Invert, 20° C. %V.	Sucrose (Clerget)— Per Cent	Glucose, Commercial (Leach's Formula)— Per Cent	Solid Matter— Per Cent	Water— Per Cent	Remarks and Conclusions
14346	40.0	-18.7	44.24	0.00	72.46	27.54	Molasses.
14345	52.0	-18.7	53.20	0.00	70.52	29.48	Sirup.
14323	100.0	70.4	22.31	41.22	73.26	26.74	Compound corn sirup and molasses.
14338	40.0	-17.6	43.44	0.00	73.64	26.36	Molasses.
14683	34.0	-15.4	37.23	0.00	80.40	19.60	Refiners sirup.
14682	38.0	-17.6	41.91	0.00	73.88	26.12	Molasses.
14322	146.0	140.8	3.93	81.18	75.50	24.50	Corn sirup with slight cane sirup flavor.
14974	24.0	-17.6	31.35	0.00	71.72	28.28	Molasses.
14973	36.0	-15.4	38.74	0.00	76.96	23.04	do.
14972	125.0	107.8	12.96	64.02	81.40	18.60	Compound sirup, sold as sirup. Misrepresented; sale illegal.
14508	118.0	83.6	25.93	52.57	75.63	24.37	Compound molasses. Sold as molasses; misrepresented; sale was illegal.
14681	137.0	125.4	8.74	73.29	77.52	22.48	Compound sirup.
14954	41.0	-18.7	45.00	0.00	73.48	26.52	Molasses.
14481	31.0	-13.2	35.57	0.00	77.38	22.62	Sirup.
14493	66.0	22.0	33.16	18.76	69.36	30.64	Compound sirup.
14440	131.0	107.8	17.48	64.86	80.10	19.90	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14504	150.0	112.2	28.49	69.43	75.87	24.13	Compound sirup.
14456	41.0	-17.6	44.17	0.00	76.03	23.97	Molasses.
14465	146.0	133.1	9.72	77.87	79.20	20.80	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14442	46.0	-19.8	49.60	0.00	72.58	27.42	Sirup.
14688	117.0	99.0	13.56	59.11	75.60	24.40	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14445	42.0	-17.6	44.92	0.00	74.00	26.00	Sirup.
14977	148.0	140.8	5.43	81.46	76.92	23.08	Compound sirup, sold as sirup; misbranded; sale is illegal.
14694	40.0	-17.6	43.41	0.00	72.51	27.49	Molasses.
14474	66.0	24.2	31.50	19.71	77.12	22.88	Compound sirup; sold as sirup, misrepresented; sale was illegal.
14692	42.0	-17.6	44.92	0.00	76.12	23.88	Molasses.

## RESULTS OF THE EXAMINATION OF MOLASSES

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14971	Molasses			R. N. Hood & Co., Matthews.
14970	do			do
14332	do		Hooker & Anthony, Greenville, N. C.	J. L. Starkey, Greenville..
14480	Sirup			H. H. Jenkins, Goldsboro.
14340	Molasses			E. T. Joyner, Rocky Mount
14336	Sirup			H. C. Joyner, Rocky Mount
14677	do			do
14968	do		Keuster-Lowe Co., Charlotte, N. C.	B. W. Kennington, N. Charlotte.
14964	Cresecent, Molasses and Corn Sirup.	Molasses and Corn Sirup.	Langhoff Bros. Co. New Orleans, La.	W. A. Norman, Charlotte.
14962	Ponce De Leon, Cane Sirup.	Sirup	S. A. & W. H. Leonard, Grand Ridge, Florida, R. 3.	Bridgers & Co., Charlotte.
14492	Molasses			Lucas & Lewis, New Bern.
14471	Sirup			J. M. Lewis, Mount Olive..
14458	Molasses			A. Levin, Wilmington
14933	do		Lexington Grocery Co., High Point, N. C.	J. E. Perryman, High Point.
14975	Sorghum			W. L. McCall & Co., Matthews
14451	Molasses			J. H. McGregor & Co., Hamlet.
14452	Sirup			do
14678	King, Compound Sirup.	Sirup, Compound.	Mangles-Herald Co., Baltimore, Md.	H. C. Joyner, Rocky Mount.
14491	Silver Drip Sirup, A Compound.	do	do	J. H. Potter, Jr. Beaufort.
14691	King, Compound Sirup.	do	do	Ballard-Cheatham Co., Franklinton.
14464	Sirup			J. E. Marshburn, Wilmington.
14495	do		T. B. Metzel & Co., Philadelphia, Pa.	E. B. Hackburn, New Bern.
14965	do		Chas. Moody Co., Charlotte, N. C.	Pope & Swain, Charlotte..
14957	Molasses		Morris Bros., Gastonia, N. C.	Elite Grocery, Gastonia...
14333	do		Morris & Co., New Orleans, La.	J. E. Willimas, Greenville..
14934	do			I. A. Morris & Bro., High Point.
14939	Molasses, Compound.			J. A. Morris & Bro., Thomasville.
14953	Alligator, Pure Louisiana Molasses.	Molasses	New Orleans Coffee Co., New Orleans, La.	Stradley & Luther, Asheville.
14315	Everybodys, Cane and Corn Sirup.	Cane and Corn.	do	J. F. Whisnant, Shelby....
14502	Molasses			H. F. Noble, Belhaven ....



AND SIRUPS AND COMPOUNDS OF SAME—*Continued.*

Laboratory Number	Polarization, Direct, 20° C. °V.	Polarization, Invert, 20° C. °V.	Sucrose (Clerget), Per Cent	Glucose, Commercial (Leach's Formula)—Per Cent	Solid Matter—Per Cent	Water—Per Cent	Remarks and Conclusions
14971	51.0	8.8	31.81	10.76	75.38	24.62	Compound molasses, sold as molasses, misrepresented; sale was illegal.
14970	37.0	—13.2	37.84	0.00	77.52	22.48	Sirup.
14332	42.0	—17.6	44.92	0.00	76.54	23.46	Molasses.
14480	128.0	101.2	20.20	61.60	77.08	22.92	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14340	38.0	—13.2	37.84	0.00	75.56	24.44	Molasses.
14336	118.0	95.7	16.80	57.82	78.00	22.00	Compound sirup; sold as sirup; misrepresented; sale was illegal
14677	118.0	94.6	17.63	57.35	79.60	20.40	do.
14968	36.0	—13.2	37.08	0.00	77.49	22.51	Sirup.
14964	71.0	41.8	22.00	28.00	69.62	30.38	Compound molasses and corn sirup—glucose.
14962	24.0	—22.0	34.67	0.00	74.68	25.32	Sirup.
14492	38.0	—17.6	41.91	0.00	73.64	26.36	Molasses.
14471	128.0	101.2	12.66	60.19	77.36	22.64	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14458	42.0	—17.6	44.92	0.00	73.76	26.24	Molasses.
14933	42.0	—17.6	44.91	0.00	72.20	27.80	do.
14975	118.0	106.5	8.66	62.48	75.12	24.88	Compound sirup, retailed as sorghum; misrepresented; sale illegal.
14451	68.0	35.2	24.72	24.73	77.40	22.60	Compound molasses, sold as molasses; misrepresented; sale was illegal.
14452	94.0	70.4	17.78	43.55	81.88	18.12	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14678	127.0	107.8	14.47	64.30	77.45	22.55	Compound sirup.
14491	144.0	112.2	23.21	69.02	78.28	21.72	do.
14691	124.0	107.8	12.21	63.88	76.94	23.06	do.
14464	88.0	52.8	26.53	35.12	70.44	29.56	Compound sirup, sold as sirup; misrepresented; sale was illegal.
14495	118.0	94.6	17.63	57.35	77.50	22.50	do.
14965	120.0	107.8	9.19	63.32	72.28	27.72	do.
14957	36.0	17.6	13.86	12.65	71.98	28.02	Compound molasses, sold as molasses; misrepresented; sale was illegal.
14333	42.0	—17.6	44.92	0.00	76.80	23.20	Molasses.
14934	82.4	55.0	20.65	35.28	73.66	26.34	Compound molasses, sold as molasses; misrepresented; sale was illegal.
14939	85.9	57.2	20.95	36.60	76.22	23.78	Compound molasses.
14953	27.0	—17.6	33.62	0.00	75.19	24.81	Molasses.
14315	80.0	44.0	27.89	29.77	71.72	28.28	Compound corn and cane sirup.
14502	125.0	94.6	22.91	58.30	72.88	27.12	Compound molasses, sold as molasses; misrepresented; sale was illegal.

## RESULTS OF THE EXAMINATION OF MOLASSES

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14475	.....	Sirup.....	.....	S. R. Odom, Goldsboro....
14969	.....	Sirup, Cane.....	.....	H. L. Parks & Co., Concord
14938	.....	Molasses.....	Peerless Grocery Co., High Point, N. C.	Tomlinson Grocery Co., Thomasville.
14966	Royal, Compound Sirup.	Sirup, Compound.	Penick & Ford, New Orleans, La.	L. B. Rogers, Charlotte....
14963	Orla, Old Fashion Molasses.	Molasses.....	do.....	Miller-Van Ness Co., Charlotte
14948	Mandy Lane, Compound Sirup.	Sirup, Compound.	do.....	J. R. Taylor, Morganton..
14320	Penford, Corn Sirup and Molasses.	Corn Sirup and Molasses.	do.....	The White-Perry Co., Fayetteville.
14319	Louisiana Beauty, Molasses and Corn Sirup.	do.....	do.....	do.....
14317	Velva, Cane and Corn Sirup.	Cane and Corn Sirup.	do.....	W. J. Byrd, Fayetteville...
14942	Car-Wi-Co., Corn and Sugar Cane Sirup.	Corn and Sugar Cane Sirup	do.....	King Grocery Co., Salisbury.
14940	.....	Molasses.....	.....	Perry Grocery Co., Lexington.
14328	.....	do.....	.....	R. B. Peters Grocery Co., Tarboro.
14329	.....	do.....	.....	do.....
14444	.....	Sirup.....	John Phillips, Laurinburg, N.C.	McLaurin & Shaw, Laurinburg.
14448	.....	Molasses.....	Phillip Patterson & Co., Richmond, Va.	D. J. McDuffie, Laurinburg.
14945	Perry's Pancake Syrup, Compound.	Sirup, Compound.	Piedmont Produce Co., Charlotte, N. C.	J. C. Gemayel, Newton...
14978	Sunlight, Cane Sirup.	Sirup.....	Pinnella Park Sirup Co., Pinnella Park, Fla.	B. D. Wilson, Aberdeen...
14476	.....	do.....	.....	H. A. Powell Grocery Co., Goldsboro.
14468	.....	Molasses.....	.....	Register Bros., Clinton...
14321	Diamond, Rock Candy Sirup.	Rock Candy Sirup.	Rigney & Co., Brooklyn, N. Y.	Variety Store Co., No. 1, Leaksville.
14951	Favorite Table Sirup, Compound.	Sirup, Compound.	do.....	W. L. Barnett, Asheville...
14346	.....	Molasses.....	.....	J. W. Riley, Wilson.....
14313	J. H. Collins, Georgia Cane Sirup.	Sirup, Cane.....	W. H. Robinson, Cairo, Ga....	Whitner & Martin, Hickory
14686	Ropo Quality, Cane Sirup, Cane Flavor.	Sirup, Compound.	Roper & Co., Petersburg, Va....	W. T. Parker, Weldon.....
14483	Farmers Favorite.	Molasses.....	.....	E. E. Rouse, La Grange...

AND SIRUPS AND COMPOUNDS OF SAME—*Continued.*

Laboratory Number	Polarization, Direct, 20° C. °V.	Polarization, Invert, 20° C. °V.	Sucrose (Clerget), Per Cent	Glucose, Com- mercial (Leach's Formula)—Per Cent	Solid Matter— Per Cent	Water—Per Cent	Remarks and Conclusions
14475	112.0	79.2	24.72	49.76	77.76	22.24	Compound sirup, sold as sirup; misrepresented, sale was illegal
14969	108.0	74.8	25.02	47.41	72.94	27.06	do.
14938	43.0	-17.6	45.68	0.00	72.90	27.10	Molasses.
14966	105.0	79.2	19.44	48.89	75.85	24.15	Compound sirup.
14963	38.0	-18.7	42.74	0.00	75.48	24.52	Molasses.
14948	110.0	95.7	10.78	56.70	77.20	22.74	Compound sirup.
14320	106.0	79.2	20.20	49.00	73.72	26.28	Compound corn sirup and molasses.
14319	72.0	40.0	24.12	27.36	75.38	24.62	do.
14317	84.0	44.0	30.15	30.77	72.20	26.80	Compound sirup.
14942	90.0	57.2	24.72	37.30	71.52	28.48	Compound corn and cane sirup.
14910	107.0	94.6	9.34	55.88	75.14	24.86	Compound molasses, sold as molasses; mis-represent- ed; sale was illegal.
14328	38.0	-17.6	41.91	0.00	73.40	26.60	Molasses.
14329	42.0	-17.6	44.92	0.00	73.28	26.72	do.
14444	42.0	-19.8	46.59	0.00	71.22	28.78	Sirup.
14448	24.0	-19.8	33.01	0.00	77.76	22.24	Molasses.
14945	99.0	67.0	24.12	42.78	71.98	28.02	Sirup.
14978	55.0	-19.8	56.38	0.00	66.72	33.28	Sirup.
14476	138.0	110.0	21.78	60.69	77.63	22.37	Compound sirup, sold by retail dealer as sirup; mis-represented. Sale was illegal.
14468	20.0	-17.6	28.34	0.00	73.10	26.90	Molasses.
14321	51.0	-22.0	55.02	0.00	67.94	32.06	Sirup.
14951	100.0	79.2	15.68	48.18	78.30	21.70	Compound sirup, misbranded; sale illegal.
14346	38.0	-17.6	41.91	0.00	73.26	26.76	Molasses.
14313	27.0	-22.0	36.93	0.00	75.88	24.12	Sirup.
14686	130.0	116.6	10.10	68.51	74.78	25.22	Corn sirup flavored with refiners sirup.
14483	60.0	22.0	28.64	17.92	75.54	24.46	Compound molasses, sold as molasses. Misrepre- sented. Sale was illegal.

## RESULTS OF THE EXAMINATION OF MOLASSES

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14347	.....	Sirup.....	.....	Ruffin-High Co., Wilson..
14443	.....	do.....	.....	Russell-Gillies Co., Laurinburg.
14454	.....	Molasses .....	.....	R. T. Sanderson, Lumberton.
14937	.....	do.....	E. A. Saunders Sons Co., Richmond, Va.	J. W. Kennedy, High Point.
14435	.....	do.....	do.....	Nisbet & Womble, Sanford
14449	.....	Sirup.....	do.....	Rice & Folsom, Hamlet...
14334	.....	Molasses.....	.....	S. M. Schultz, Greenville...
14500	.....	do.....	.....	R. L. Smith Supply Co., Belhaven.
14463	.....	Sirup.....	.....	Southern Grocery, Wilmington.
14941	Homade, Sorghum.	Sirup, Sorghum.	Southern Syrup Co., Montgomery, Ala.	N. P. Murphy, Salisbury..
14680	Blue Ribbon, Cane Sirup.	Sirup.....	do.....	G. F. Jones & Son, Rocky Mount.
14479	.....	do.....	.....	Spence & Vinson, Goldsboro.
14693	.....	Molasses.....	.....	D. W. Spivey, Youngsville
14189	Turkey Brand, Table Sirup.	Sirup, Compound.	J. Stromeyer & Co., Philadelphia, Pa.	J. C. Helms, Morehead City.
15003	Choice Molasses..	Molasses.....	do.....	S. G. Roberts, New Bern...
15005	1109 Porto Rico Molasses.	do.....	do.....	Armstrong Grocery Co., New Bern.
15004	C P. Molasses.....	do.....	do.....	C. S. Hollister Co., New Bern.
14495	.....	Sirup.....	.....	A. T. Summerlin, Washington.
14496	.....	Molasses.....	.....	W. M. Swanner, Washington.
14344	.....	do.....	.....	T. R. Lamm, Wilson.....
14501	.....	do.....	.....	U. W. Tarkington, Belhaven.
14478	.....	Sirup.....	.....	C. D. Taylor & Co., Goldsboro.
14339	.....	Molasses.....	.....	C. D. Tharrington, Rocky Mount.
14330	.....	Molasses.....	Thomas & Anthony, Greenville, N. C.	E. H. Parkerson, Greenville.
14459	.....	do.....	.....	Thomas Grocery Co., Wilmington.
14932	.....	do.....	Thomas-Howard Co., Greensboro, N. C.	C. Dunbar, High Point....
14473	.....	do.....	Thornton & Banks, Goldsboro, N. C.	A. M. Pate, Goldsboro....
14482	.....	do.....	do.....	E. S. Newborn, LaGrange.
14944	.....	Sorghum, Compound.	Tiedeman, Charleston, S. C.	J. L. Nix, Salisbury.....
14485	.....	Sirup.....	.....	F. D. Tilley, Kinston.....
14487	Crystal White, Compound Sirup.	Sirup, Compound.	Torbitt & Castleman Co., Louisville, Ky.	Elmer Nichols, Morehead City.

AND SIRUPS AND COMPOUNDS OF SAME—*Continued.*

Laboratory Number	Polarization, Direct, 20° C. °V.	Polarization, Invert, 20° C. °V.	Sucrose (Clerge), Per Cent	Glucose, Con- mercial (Leach's Formula)—Per Cent	Solid Matter— Per Cent	Water—Per Cent	Remarks and Conclusions
14347	34.0	-13.2	35.57	0.00	80.70	19.30	Sirup.
14443	40.0	-17.6	43.41	0.00	73.08	26.92	do.
14454	36.0	-17.6	40.40	0.00	78.46	21.54	Molasses.
14937	42.0	-17.6	44.91	0.00	73.26	26.74	do.
14135	39.0	-17.6	42.66	0.00	72.60	27.40	do.
14449	44.0	-19.8	48.00	0.00	74.60	25.40	Sirup.
14334	42.0	-15.4	42.26	0.00	77.94	22.06	Molasses.
14500	122.0	88.0	25.63	55.06	76.42	23.58	Compound molasses, sold as molasses, misrepresented: sale was illegal.
14163	92.0	57.2	26.23	37.60	70.94	29.06	Compound sirup, sold as sirup, misrepresented; sale was illegal.
14911	24.4	-14.3	29.17	0.00	70.66	29.34	Sirup which appears to be sorghum.
14680	40.0	-15.4	11.76	0.00	70.20	29.80	Sirup.
14479	112.0	77.6	26.38	48.92	76.20	23.80	Compound sirup, sold as sirup. Misrepresented. Sale was illegal
14693	29.0	-15.4	33.36	0.00	74.42	25.58	Molasses.
14489	115.0	88.0	20.35	54.09	75.10	24.90	Compound sirup, misbranded; sale illegal.
15003	40.0	-17.6	43.41	0.00	75.80	24.20	Molasses.
15005	34.0	-13.2	35.58	0.00	76.78	23.22	do.
15004	22.0	-13.2	26.53	0.00	76.51	23.49	do.
14498	118.0	88.0	22.61	54.51	76.06	23.94	Compound sirup, sold as sirup. Misrepresented; sale was illegal.
14496	124.0	94.6	22.16	58.20	76.80	23.20	Compound molasses, sold as molasses, misrepresented. Sale was illegal.
14344	30.0	-13.2	32.56	0.00	76.40	23.60	Molasses.
14501	114.0	77.0	27.89	49.20	76.84	23.16	Compound molasses, sold as molasses, misrepresented, sale was illegal.
14478	124.0	99.0	18.84	60.09	78.34	21.66	Compound sirup, sold as sirup, misrepresented. Sale was illegal.
14339	40.0	-17.6	43.44	0.00	74.22	25.78	Molasses.
14330	42.0	-17.6	44.92	0.00	71.44	28.56	do.
14459	40.0	-17.6	43.41	0.00	74.65	25.35	do.
14932	42.0	-17.6	44.91	0.00	73.74	26.26	do.
14473	40.0	-13.2	40.10	0.00	74.54	25.46	do.
14482	41.0	-15.4	42.51	0.00	73.14	26.86	do.
14944	125.0	108.9	12.13	64.50	74.74	25.26	Compound sirup, containing small amount of sirup.
14485	118.0	88.0	22.61	54.48	78.02	21.98	Compound sirup, sold as sirup. Misrepresented, Sale was illegal.
14487	154.0	125.4	21.55	75.68	73.22	26.78	Compound sirup.

## RESULTS OF THE EXAMINATION OF MOLASSES

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14914	Crystal White Compound Sirup.	Sirup, Compound.	Torbitt & Castleman Co., Louisville, Ky.	Bristol's Grocery Store, Morganton.
14509	Melwood, Molasses and Corn Sirup.	do.	do.	Morrisette Bros., Elizabeth City.
14446	do.	Sirup.	do.	C. B. Tysor, Laurinburg.
14494	Medallion, Compound Sirup.	Sirup, Compound.	S. J. VanLill Co., Baltimore, Md.	H. C. Armstrong Grocery Co., New Bern.
14696	do.	Molasses.	do.	Wake Forest Supply Co., Wake Forest.
14695	do.	do.	do.	Wake Mercantile Co., Wake Forest.
14455	do.	do.	do.	White & Gough, Lumberton.
14314	Uniform, Cane Sirup.	Sirup.	D. R. Wilder Mfg. Co., Atlanta, Ga.	W. J. Lowry, Rockingham.
14324	do.	do.	do.	Waynick & Turner Co., Greensboro.
14325	Southern Farm, Sorghum and Corn Sirup.	Sorghum and Corn Sirup.	do.	C. Scott & Co., Greensboro.
14976	Bonita, Cane and Corn Sirup.	Cane and Corn Sirup.	do.	J. T. Pinkston & Son, Wadesboro.
14343	do.	Molasses.	do.	J. D. Williams, Wilson.
14690	do.	Sirup.	do.	C. S. Williams, Henderson.
14497	do.	Molasses.	do.	W. Gray Willis, Washington.
14687	Lynnhaven, Table Sirup, Compound.	Sirup, Table.	E. L. Woodard & Co., Norfolk, Va.	E. C. Bobbitt, Littleton.
14331	do.	Molasses.	do.	York-Perkins & Co., Greenville.

## OLIVE AND OTHER TABLE AND COOKING OILS

Olive oil is the oil obtained from the sound, mature fruit of the cultivated olive tree. It is a very choice table oil and is largely used.

Six samples were examined, and of the six one was misbranded. It was branded "Blended Oil." It was composed of cotton-seed oil and

AND SIRUPS AND COMPOUNDS OF SAME—*Continued.*

Laboratory Number	Polarization, Direct, 20° C. %V.	Polarization, Invert, 20° C. %V.	Sucrose (Clerget), Per Cent	Glucose, Commercial (Leach's Formula)—Per Cent	Solid Matter—Per Cent	Water—Per Cent	Remarks and Conclusions
14049	137.0	121.0	12.06	71.39	70.28	29.72	Compound sirup.
14509	86.0	61.6	18.39	38.62	76.02	23.98	Compound molasses.
14446	154.0	154.0	0.00	88.00	75.47	24.53	Corn sirup, sold as sirup; misbranded; sale illegal.
14494	137.0	112.2	18.69	67.60	75.34	24.66	Compound sirup.
14696	36.0	-13.2	37.08	0.00	76.00	24.00	Molasses.
14695	37.0	-13.2	37.84	0.00	75.26	24.74	do.
14455	40.0	-17.6	43.41	0.00	74.94	25.06	do.
14314	44.0	-19.8	48.09	0.00	71.74	28.26	Cane sirup.
14324	42.0	-19.8	46.58	0.00	72.44	27.56	do.
14325	86.0	63.8	16.73	39.54	76.80	23.20	Corn sirup and cane sirup, corn sirup being in excess should be first on label.
14976	98.0	54.0	33.16	36.48	72.04	27.96	Compound sirup.
14343	40.0	-17.6	43.44	0.00	74.24	25.76	Molasses.
14690	34.0	-13.2	35.57	0.00	80.40	19.60	Sirup.
14497	40.0	-13.2	40.10	0.00	73.78	26.22	Molasses.
14687	120.0	103.4	12.51	61.42	77.52	22.48	Compound sirup branded fancy table sirup, misbranded, sale was illegal.
14331	42.0	-19.8	46.58	0.00	76.19	23.81	Molasses.

olive oil. Cotton-seed oil and olive oil not being like substances could not, under the food law, constitute a blend. Unlike substances constitute when mixed, as in the case of two or more different oils, a compound, and not a blend.

## RESULTS OF THE EXAMINATION OF OLIVE

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14738	Olive Oil.....	W. E. Beavans, Enfield, N. C.....	W. E. Beavans, Enfield.....
15013	Blended Oil, Eddy's Superior Quality.	Eddy & Eddy Mfg. Co., St. Louis, Mo.	Clarence T. Bernhardt, Salisbury.
15011	Olive Oil, Hirsch's Goodies	Hirsch Bros. & Co., Louisville, Ky.	Kinley Grocery Co., High Point.
14599	Olive (Sweet) Oil, Our Perfection.	Loewy Drug Co., Baltimore, Md.	Ruffin-High Co., Wilson.....
14603	Olive Oil, Parke's.....	L. H. Parke & Co., Philadelphia, Pa.	C. B. Redmond Parlor Grocery Lumberton.
14602	Olive Oil.....	John M. Scott & Co., Charlotte, N. C.	L. H. Caldwell, Lumberton.....

## ORANGE EXTRACT AND ORANGE EXTRACT SUBSTITUTES

## DEFINITIONS AND STANDARDS.

Orange extract is the flavoring extract prepared from oil of orange, or from orange peel, or both, and contains not less than 5 per cent by volume of oil of orange. Oil of orange is the volatile oil obtained from the fresh peel of the orange.

Five samples branded "Orange Extract" and one branded "Orange Flavoring, High Grade," have been examined during the year. The

## RESULTS OF THE EXAMINATION OF ORANGE

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15068	Orange Flavoring, High Grade, Curex Brand.	Curex Remedy Co., Baltimore, Md.	L. C. Bickett, Newton.....
15065	Orange Extract, N. P. D. Brand.	Norman-Perry Drug Co., Winston-Salem, N. C.	I. A. Morris & Bro., High Point..
15063	Orange Extract.....	Owens & Minor Drug Co., Richmond, Va.	B. F. Powell, Clinton
15062	Orange Extract, Spartan Brand, Concentrated.	The Southern Chemical Co., Petersburg, Va.	E. H. Parkerson, Greenville.....
15064	Orange Extract, Purl Brand.	Suffolk Drug and Extract Co. (Inc.), Suffolk, Va.	Sawyer Grocery Co., Belhaven..
15067	Orange Extract, Watkins.	J. R. Watkins Medical Co., Winona, Minn.	C. P. Shuping, Salisbury.....



## AND OTHER TABLE AND COOKING OILS.

Laboratory Number	Halphen's Test for Cotton-seed Oil	Baudouin's Test for Sesame Oil	Reading Refractometer, 15.5° C.	Refractive Index	Specific Gravity, 15.5° C.	Remarks and Conclusions
14738	Negative...	Negative...	68.0	1.4710	0.91585	Olive oil.
15013	Positive....	do.....	73.0	1.4742	0.92164	Compound oil and not a blended oil; misbranded sale illegal.
15011	Negative....	do.....	68.0	1.4710	0.91584	Olive oil.
14599	do.....	do.....	69.0	1.4717	-----	do.
14603	do.....	do.....	69.0	1.4717	-----	do.
14602	do.....	do.....	69.0	1.4717	-----	do.

courts have held that the term orange flavoring or lemon flavoring is synonymous with the terms orange extract or lemon extract. That being the case sample No. 15068, branded "Orange Flavoring," containing no oil of orange, is misbranded. Two other samples contain less than five per cent of oil of orange, and are, therefore, adulterated. One sample was branded "Orange Extract, Concentrated." As it was less than one per cent above standard, it could not be regarded as concentrated, and it is misbranded.

See table below.

## EXTRACTS AND ORANGE EXTRACT SUBSTITUTES.

Laboratory Number	Orange Oil by Polarization	Orange Oil by Precipitation	Alcohol (by Volume)—Per Cent	Remarks and Conclusions
15068	0.00	0.00	18.18	Imitation orange extract, labeled high grade orange flavoring. Misbranded; sale illegal.
15065	3.90	4.00	91.52	Orange extract, below standard; adulterated; sale illegal.
15063	-----	4.00	76.42	do.
15062	5.70	5.80	91.57	Orange extract, misbranded. It is not concentrated as branded; sale illegal.
15064	5.70	5.80	91.05	Orange extract.
15067	5.30	5.40	-----	do.

## PEPPERMINT EXTRACT

## DEFINITIONS AND STANDARDS.

Peppermint extract is the flavoring extract prepared from oil of peppermint, or from peppermint, or both, and contains not less than 3 per cent by volume of oil of peppermint. Oil of peppermint is the volatile oil obtained from peppermint.

## RESULTS OF THE EXAMINATION

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15060	Peppermint Extract, Brame's.	Peppermint Extract.	Brame Drug Co., N. Wilkesboro, N. C.	Brame Drug Co., N. Wilkesboro.
15887	Spirits Pepperm't	Spirits Pepperm't	J. C. Brantley, Raleigh, N. C.	J. C. Brantley, Raleigh....
15886	Essence of Peppermint, Burnett's.	Essence of Peppermint.	Joseph Burnett Co., Boston, Mass.	J. R. Ferrall & Co., Raleigh
15885	Peppermint Extract, Blue Ribbon.	Peppermint Extract.	Greever-Lotspeich Mfg. Co., Knoxville, Tenn.	Rudy & Buffaloe, Raleigh.
15884	Peppermint Extract, Heckin's White Cap.	.....do.....	The Heckin Spice Co., Cincinnati, Ohio.	M. Rosenthal & Co., Raleigh.
15066	Peppermint Flavor, Watkins.	Peppermint Flavor	The Watkins Medical Co., Winona, Minn.	C. P. Shuping, Salisbury..

## RICE

Under the National Food Law, and the regulations of the United States Department of Agriculture, the use of talc and glucose as a coating for rice, in interstate commerce, is permitted, provided that the label of each package bears the following statement: "Coated with glucose and talc. Remove by washing."

## RESULTS OF THE EX

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14701	Rice, White Cap, Uncoated	C. W. Antrim & Sons Co., Richmond, Va.	Nesbit & Womble, Sanford.....
14708	Rice, Mayfield, Coated	.....do.....	J. W. Davenport, Rocky Mount..
15398	Rice, Nogara.....	Aragon Coffee Co., Richmond, Va.	F. A. Brown, Spencer.....
14705	Rice, Republic, Choice Japan.	Austin-Nichols & Co., New York, N. Y.	W. T. Satterfield, Edenton.....
15400	Rice, Choice Selected, Coated	Carolina Rice Mills, N. C.	Goldsboro, M. Rosenthal & Co., Raleigh....
15399	Rice, Gillie's Standard, Uncoated.	Edward J. Gillies & Co., New York, N. Y.	Carland-McGuire Co., Canton..

In the table below the results of the examinations of six samples are reported, four of which appear to be normal extract, and one appears to be a very concentrated extract, containing 8.80 per cent of peppermint oil. One sample, No. 15066, appears to be below standard and adulterated containing only 1.20 per cent of peppermint oil, when it should contain not less than 3 per cent of oil.

## OF PEPPERMINT EXTRACTS.

Laboratory Number	Peppermint Oil by Precipitation—Per Cent	Alcohol (by Volume)—Per Cent	Remarks and Conclusions
15060	3.00	-----	Peppermint extract.
15887	8.80	84.20	Peppermint extract, very concentrated.
15886	3.40	88.80	Peppermint extract.
15885	3.20	71.05	do.
15884	3.00	72.30	do.
15066	1.20	-----	Peppermint extract, below standard, adulterated; sale was illegal.

Rice coated with glucose and talc, to comply with the requirements of the law must show that the rice is coated, and that same can be removed by washing.

For results of the examination of samples examined see table below.

## AMINATION OF RICE.

Laboratory Number	Test for Talc	Remarks and Conclusions
14701	Negative...	Rice, uncoated.
14708	Positive....	Rice, coated with glucose and talc.
15398	....do.....	Rice, coated with glucose and talc and not so stated on label; sale was illegal.
14705	....do.....	Rice, coated with glucose and talc and fact not stated on label; was not choice rice as branded; misbranded; sale illegal.
15400	....do.....	Rice, coated with glucose and talc.
15399	Negative...	Rice, not coated.

## RESULTS OF THE EXAMINATIONS

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14700	Rice, Granulated, Hotel Astor, Uncoated.	B. Fischer & Co., New York, N. Y.	Gaston G. Levy & Bro., Rocky Mount.
14703	Rice, Hotel Astor, Uncoated.	do.	Spencer & Co., Kinston.
14707	Rice, Flag Brand.	R. G. Hart, Rocky Mount, N. C.	R. G. Hart, Rocky Mount.
15397	Rice, Natural Finish.	High Point Grocery Co., High Point, N. C.	J. W. Kennedy, High Point.
14704	Rice.	Walter J. Moses, New York, N. Y.	Kinston Peanut Co., Kinston.
14709	Rice, Little Boy Blue.	Overbacker Coffee Co., Louisville, Ky.	L. T. Wilson, Wake Forest.
14702	Rice, Parkes, Uncoated.	L. H. Parke & Co., Philadelphia Pa.	M. L. Milliken & Co., Hamlet.
14706	Rice.		Red Star Stores, Rocky Mount.
14377	Rice.	Standard Milling Co., Crawley, La.	R. H. Pickett & Co., Wilmington.

## SWEET OIL

Sweet oil is olive oil. Any oil other than olive oil branded sweet oil would be misbranded. It is not correct to label cotton-seed oil sweet oil, and elsewhere on the label describe the true character of the oil.

There seems to have been a difference of opinion as to what constitutes sweet oil. The Department in 1911 made an investigation of the subject and found that the only oil to which the term "sweet oil" may be correctly applied is olive oil. The United States Department of Agriculture in food inspection decision No. 139 has since that time held

## RESULTS OF THE EXAMINATION OF

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14596	Sweet Oil, Keller's.	Carr-Owens & Co., Baltimore, Md.	W. H. Johnson, Greenville.
14598	Sweet Oil, C. C. C. Brand.	Clotworthy Chemical Co., Baltimore, Md.	J. D. Williams, Wilson.
14607	do.	do.	Sawyer Grocery Co., Belhaven.
15014	Sweet Oil, Swan Brand.	Cumberland Mfg. Co., Nashville, Tenn.	Ballance-Sullivan Co., Statesville.
14613	Sweet Oil, Dove Brand.	Frank Tea and Spice Co., Cincinnati, Ohio.	J. A. Woodard Holmes Co., Edenton.
14604	do.	do.	W. D. Creech, Goldsboro.
14605	Olive, Sweet Oil, Gilbert's No. 10.	Gilbert Bros. & Co., Baltimore, Md.	Klein Bros., Morehead City.
14601	Sweet Oil and Cotton-seed Oil Compound, I. C. Brand.	Interstate Commerce Co., Richmond, Va.	M. L. Milliken & Co., Hamlet.

# THE BULLETIN

## NATION OF RICE—*Continued.*

Laboratory Number	Test for Tale	Remarks and Conclusions
14700	Negative ..	Rice, not coated.
14703	....do.....	do.
14707	....do.....	Rice, uncoated; contained large amount of small, dark, inferior grains.
15397	....do.....	Rice, uncoated.
14704	....do.....	do.
14706	....do.....	do.
14702	....do.....	do.
14706	....do.....	do.
14377	....do.....	do.

that any oil other than olive oil is misbranded when sold under the name "Sweet Oil," and it is not correct to label cotton-seed oil as "sweet oil" and then elsewhere place on the label words to describe the true character of the oil.

Cotton-seed oil is a good food product and justly deserves the good reputation that it has, but it is not sweet oil and can not be legally sold as sweet oil. It should be sold under its own good name, Cotton-seed Oil.

For samples examined during the year see table below.

## SWEET OIL AND SWEET OIL SUBSTITUTES.

Laboratory Number	Hafphen's Test for Cotton-seed Oil	Baudouin's Test for Sesame Oil	Reading Refractometer, 15.5° C.	Refractive Index	Specific Gravity, 15.5° C.	Remarks and Conclusions
14596	Negative...	Negative...	69.0	1.4717	-----	Sweet oil.
14598	....do.....	....do.....	69.0	1.4717	-----	do.
14607	....do.....	....do.....	69.0	1.4717	-----	do.
15014	....do.....	....do.....	68.0	1.4710	0.91630	do.
14613	....do.....	....do.....	69.0	1.4717	-----	do.
14604	....do.....	....do.....	69.0	1.4717	-----	do.
14605	....do.....	....do.....	69.0	1.4717	-----	do.
14601	Positive...	....do.....	74.0	1.4747	-----	Cotton-seed oil, branded compound sweet and cotton-seed oil; misbranded; it contained no sweet oil; sale is illegal.

## RESULTS OF THE EXAMINATION OF SWEET

Laboratory Number	Material and Brand from Label	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14740	Sweet Oil.....	Interstate Chemical Co., Baltimore, Md.	Balti-Southern Grocery Co., Hender- son.
14606	Olive (Sweet) Oil, Our Per- fection.	Loewy Drug Co., Baltimore, Md.	J. B. Morton, Morehead City....
14600	Sweet Oil, McCormick's Reliable.	McCormick & Co., Baltimore, Md.	Ruffin-High Co., Wilson.....
14737	Sweet Oil, Crown Brand.....	do.....	H. C. Joyner, Rocky Mount....
14597	Sweet Oil.....	do.....	H. C. Joyner, Rocky Mount....
15012	Sweet Oil, N. P. D. Brand.....	Norman-Perry Drug Co., Winston- Salem, N. C.	Perry Grocery Store, Lexington..
15016	Sweet Oil.....	Sanford-Chamberlain, Albers Co., Knoxville, Tenn.	S. A. DeHart & Co., Bryson City.
15017	do.....	John M. Scott & Co., Charlotte, N. C.	Harry-Baber Co., Gastonia....
15015	Sweet Oil, Pure Medicinal.	Dr. T. C. Smith, Asheville, N. C.	M. M. Wells, Canton.....
14610	Sweet Oil, Standard Brand	Standard Drug Co., Elizabeth City, N. C.	F. G. Terrell, Belhaven.....
14615	Sweet Oil, Commercial ....	Suffolk Drugs and Extract Co., Suffolk, Va.	A. B. Seely & Son, Elizabeth City
14741	Sweet Oil, Commercial, Pure Brand.	do.....	J. F. White Co., Oxford.....
14739	Sweet Oil, Old Homestead Brand.	Southern Drug Co., Norfolk, Va.	Littleton Feed and Grocery Co., Littleton.
14614	Sweet Oil.....	Terry-Taylor Drug Co., Norfolk, Va.	do.....
14609	Sweet Oil, We-Li-Ka.....	We-Li-Ka Mfg. Co., Memphis, Tenn.	Sawyer Grocery Co., Belhaven..
14608	Sweet Oil, Cotton-seed Oil.	do.....	do.....
14612	Sweet Oil.....	Williams, Martin & Gray, Norfolk, Va.	W. T. Hollowell, Edenton.....
14611	Sweet Oil, Uniform, Re- liable.	do.....	W. S. Blanchard & Son, Hartford.

## VANILLA EXTRACTS AND VANILLA EXTRACT SUBSTITUTES

## DEFINITIONS AND STANDARDS.

Vanilla extract is the flavoring extract prepared from vanilla bean, with or without sugar or glycerin, and contains in one hundred cubic centimeters (100 cc.) the soluble matters from not less than ten (10) grams of the vanilla bean.

The adulterants of vanilla extract are tonka bean extract, artificial vanillin, artificial coumarin, caramel and coal-tar colors. Artificial va-

OIL AND SWEET OIL SUBSTITUTES—*Continued.*

Laboratory Number	Halphen's Test for Cotton-seed Oil	Baudouin's Test for Sesame Oil	Reading Refractometer, 15.5° C.	Refractive Index	Specific Gravity, 15.5° C.	Remarks and Conclusions
14740	Positive....	Negative....	74.0	1.4747	0.92188	Cotton-seed oil; branded absolutely pure sweet oil; misbranded; sale illegal.
14606	Negative.....	do.....	69.0	1.4717		Sweet oil.
14600	do.....	do.....	69.0	1.4717		do.
14737	Positive.....		74.0	1.4747	0.92269	Cotton-seed oil, branded sweet oil; misbranded; sale illegal.
14597	do.....	Negative....	74.0	1.4747		Cotton-seed oil, labeled sweet oil; misbranded; sale illegal.
15012	do.....	do.....	74.0	1.4748	0.92274	Cotton-seed oil, labeled on bottle sweet oil; misbranded; sale illegal.
15016	Negative.....	do.....	68.0	1.4710	0.91617	Sweet oil.
15017	do.....	do.....	68.0	1.4710	0.91614	do.
15015	Positive.....	do.....	74.0	1.4748	0.92280	Cotton-seed oil, branded sweet oil; misbranded; sale illegal.
14610	Negative.....	do.....	69.0	1.4717		Sweet oil.
14615	Positive.....	do.....	74.0	1.4747		Cotton-seed oil, branded sweet oil; misbranded; sale illegal.
14741	do.....	do.....	74.0	1.4747	0.92172	do.
14739	do.....	do.....	74.0	1.4747	0.92269	do.
14614	Negative.....	do.....	78.0	1.4771		Not sweet oil; misbranded; sale illegal.
14609	do.....	do.....	69.0	1.4717		Sweet oil.
14608	Positive.....	do.....	74.0	1.4747		Cotton-seed oil; not sweet oil as branded; sale illegal.
14612	do.....	do.....	74.0	1.4747		do.
14611	Negative.....	do.....	69.00	1.4717		Sweet oil.

nillin is the same as the chief flavoring principle of the vanilla bean, but the extract made from this substance lacks the flavor of genuine vanilla extract, owing to the absence of other substances, which cannot be successfully imitated. Tonka beans are much cheaper than vanilla beans and have a ranker and more stringent flavor, due to coumarin, which is also prepared artificially for use in extracts.

By reference to the table below it will be seen that of the 34 samples of these products examined a good many of them were adulterated and misbranded.

## RESULTS OF THE EXAMINATION OF VANILLA

Laboratory Number	Material and Brand from Lab.	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15042	Vanilla Extract, Anchor.	Extract Vanilla	Anchor Co., Nashville, Tenn.	Heath-Morrow Co., Monroe.
15021	.....do.....	.....do.....	W. E. Beavans, Enfield, N. C.	W. E. Beavans, Enfield....
14654	Vanilla.....	Extract Vanilla Compound.	Robt. R. Bellamy, Wilmington, N. C.	C. O. Knox, Wilmington..
15035	Vanilla Substitute, Snow Cap.	Extract Vanilla Substitute.	The Blue Ridge Tea Co., Asheville, N. C.	The Blue Ridge Tea Co., Asheville.
14661	Extract Vanilla, Peacock.	Extract Vanilla	Bristol Drug Mfg. Co., Bristol, Tenn.-Va.	D. M. Roberts & Co., New Bern.
15026	Imitation Vanilla, Mitchell's.	Extract Vanilla, Imitation.	Chamberlain Medicine Co., Des Moines, Ia.	Z. M. Silman, High Point..
15038	Vanilla Extract, Chamberlain's.	Extract Vanilla	.....do.....	J. E. Webb, Shelby.....
14656	Vanilla Extract, Pure, Concentrated.	.....do.....	J. M. Chesnutt & Co., Clinton, N. C.	J. M. Chesnutt, Clinton
14662	Vanilla Substitute, Regal.	Extract Vanilla, Substitute.	Clark, Chapin & Bushnell, New York, N. Y.	Walter Credle Co., Washington.
14657	Vanilla Extract, C. C. C. Brand.	Extract Vanilla	Clotworthy Chemical Co., Baltimore, Md.	W. D. James, Mount Olive.
14658	Vanilla Extract, Royal Windsor.	.....do.....	Cumberland Mfg. Co., Nashville, Tenn.	S. R. Odom, Goldsboro...
15041	Vanilla Extract, Stag.	.....do.....	Druid Mfg. Co., Baltimore, Md.	Heath-Morrow Co., Monroe
14663	Vanilla Substitute, Vano.	Extract Vanilla, Substitute.	Fitzhugh-Peregay & Co., Baltimore, Md.	Sawyer Grocery Co., Belhaven.
15030	Vanilla Extract, Compound, Our Own.	Extract Vanilla, Compound	H. C. Gaither, Statesville, N. C.	H. C. Gaither, Statesville..
15037	Vanilla Extract, Tower.	Extract, Vanilla	Gilbert Bros. & Co., Baltimore, Md.	T. M. Coghurn & Bro., Canton.
14652	Vanilla Extract, Imitation, Hygienic Pet.	Extract Vanilla, Imitation.	Hygienic Mfg. Co., Kansas City, Mo.	H. L. McRae, Maxton....
15022	Vanilla Extract, Fowler's.	Extract, Vanilla	Interstate Commerce Co., Richmond, Va.	Herbert Smith, Littleton..
14666	Vanilla Extract, Imitation.	Extract Vanilla, Imitation.	J. J. Larkin, Baltimore, Md.	D. R. Morgan & Co., Elizabeth City.
14651	Vanilla Extract, Bee Brand.	Extract, Vanilla	McCormick & Co., Baltimore, Md.	N. C. Phillips & Co., Maxton.
14659	Vanilla Extract, Imitation, Delta.	Extract, Vanilla, Imitation.	Newton Tea and Spice Co., Cincinnati, Ohio.	T. B. Holloway, Kinston..
15027	Vanilla Extract, N. P. D.	Extract, Vanilla	Norman-Perry Drug Co., Winston-Salem, N. C.	Perry Grocery Co., Lexington.
14655	Vanilla Extract, Owens & Minor.	.....do.....	Owens & Minor Drug Co., Richmond, Va.	B. F. Powell, Clinton.....
15032	Vanilla Extract, Dr. Price's.	.....do.....	Price Flavoring Extract Co., New York, N. Y.	Clarence Sawyer, Asheville
15022	Vanilla Extract, Ropo.	.....do.....	Roper & Co., Petersburg, Va.	W. A. Harris, Littleton....
15033	Vanilla Extract, Purity.	Extract, Vanilla	Clarence Sawyer, Asheville, N. C.	Clarence Sawyer, Asheville.



## EXTRACTS AND VANILLA EXTRACT SUBSTITUTES.

Laboratory Number	Total Solids — Per Cent	Ash — Per Cent.	Lead Number, Normal (Winton)	Vanillin — Per Cent	Coumarin	Specific Gravity, 15.6° C.	Remarks and Conclusions
15042	1.53	0.08	0.11	0.17	0.08%	0.9975	Compound extract vanilla; adulterated; misbranded; sale illegal.
15021	31.50	0.06	0.09	-----	Negative	1.086	Imitation extract vanilla sold as extract vanilla; misrepresented; sale illegal.
14654	23.07	0.09	-----	-----	Positive	1.0741	Compound extract vanilla; misbranded on carton; sale was illegal.
15035	-----	-----	0.09	0.61	-----	1.0638	Imitation vanilla extract.
14661	4.73	0.44	0.67	0.24	Negative	1.0108	Vanilla extract.
15026	16.00	0.11	0.17	-----	-----	1.0455	Imitation vanilla extract.
15038	23.00	0.55	1.10	0.27	Negative	1.0198	Vanilla extract.
14656	8.68	0.05	0.11	0.71	0.09%	1.0027	Compound vanilla extract; misbranded; sale illegal.
14662	0.50	0.08	0.17	0.31	Positive	1.0682	Imitation vanilla extract.
14657	13.91	0.45	0.69	0.22	Negative	0.9839	Vanilla extract.
14658	7.55	0.44	0.62	0.23	Negative	0.9817	do.
15011	39.75	0.09	0.16	0.62	0.16%	1.1329	Compound extract vanilla; adulterated and misbranded; sale illegal.
11663	7.09	0.05	0.08	0.75	Positive	1.0792	Imitation vanilla extract.
15030	21.59	0.09	0.13	0.30	0.16%	1.0648	Compound vanilla extract.
15037	20.88	0.36	0.85	0.20	Negative	1.0288	Vanilla extract.
14652	12.06	0.02	0.14	0.43	0.08%	1.0262	Imitation vanilla extract.
15023	21.90	-----	0.65	-----	Negative	1.0342	Vanilla extract.
14666	3.31	0.03	0.16	0.06	Positive	1.0767	Imitation vanilla extract.
14651	22.11	0.46	0.71	0.26	Negative	1.0383	Vanilla extract.
14659	17.48	0.04	0.02	0.76	Positive	1.0470	Imitation vanilla extract.
15027	20.06	0.27	0.47	-----	Negative	0.9922	Vanilla extract.
14655	24.57	0.35	0.58	0.26	do.	1.0458	do.
15032	14.70	0.27	0.46	0.20	do.	0.9996	do.
15022	19.10	0.29	-----	-----	Positive	1.0126	Compound extract vanilla; misbranded; sale illegal.
15033	18.62	0.33	0.52	-----	Negative	1.0074	Vanilla extract.

## RESULTS OF THE EXAMINATION OF VANILLA EXTRACTS

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
15040	Vanilla Flavoring, Concentrated.	Extract, Vanilla, Substitute.	John M. Scott & Co., Charlotte, N. C.	L. B. Rogers, Charlotte....
14653	Vanilla Extract, Imitation, Vanillorine.	Extract, Vanilla, Imitation	.....do.....	J. H. Wishart, Lumberton..
15025	Vanilla, Keystone Brand.	Extract, Vanilla.	Keystone Drug Co., Bloomsburg, Pa.	Southern Grocery Co., Henderson.
15036	Vanilla Extract, Ferndell.	.....do.....	Sprague-Warner & Co., Chicago, Ill.	E. C. Jarrett, Asheville....
15024	Vanilla Extract, New Era.	.....do.....	Terry-Taylor Drug Co., Norfolk, Va.	Southern Grocery Co., Henderson.
15028	Vanilla, Vanillin and Coumarin.	Extract, Vanilla, Imitation.	J. R. Watkins Medical Co., Winona, Minn.	C. P. Shuping, Salisbury..
15039	Vanilla Extract, Webb's.	Extract, Vanilla.	Webb Mfg. Co., Nashville, Tenn.	Briscoe & Hamilton, Rutherfordton.
14665	Vanilla Extract, Robin Hood.	.....do.....	R. C. Williams & Co., New York, N. Y.	Gideon Pendleton, Elizabeth City.
14664	Vanilla Extract	.....do.....	Williams-Martin & Gray, Norfolk, Va.	White & Co., Hertford....

## VINEGAR AND VINEGAR SUBSTITUTES

## VINEGAR STANDARDS.

Vinegar is the product made by the alcoholic and subsequent acetous fermentation of the juice of apples, and contains not less than 4.00 per cent of acetic acid, not less than 1.60 per cent of apple solids, of which not more than 50.00 per cent are reducing sugars, and not less than 0.25 per cent of apple ash.

Wine vinegar is the product made by the alcoholic and subsequent acetous fermentation of the juice of grapes, and contains not less than 4.00 per cent of acetic acid, not less than 1.00 per cent of grape solids, and not less than 0.13 per cent of grape ash.

Malt vinegar is the product made by the alcoholic and subsequent acetous fermentation, without distillation, of an infusion of barley malt or cereals whose starch has been converted by malt, is dextro-rotatory, and contains not less than 4.00 per cent of acetic acid, not less than 2.00 per cent of solids, and not less than 0.2 per cent of ash.

Spirit vinegar is the product made by the acetous fermentation of dilute distilled alcohol, and contains not less than 4.00 per cent acetic acid.

Food Inspection Decision No. 140, United States Department of Agriculture, defines vinegar as follows:

"Vinegar is the product made from the alcoholic and subsequent acetous fermentation of the expressed juice of apples." The decision further

AND VANILLA EXTRACT SUBSTITUTES—*Continued.*

Laboratory Number	Total Solids—Per Cent	Ash—Per Cent.	Lead Number, Normal (Winton)	Vanillin—Per Cent	Coumarin	Specific Gravity, 15.6° C.	Remarks and Conclusions
15040	1.89	0.15	0.26	0.31	0.23%	1.0285	Compound extract vanilla; misbranded; sale illegal.
14653	25.18	0.06	0.08	0.71	Negative ----	1.0738	Imitation vanilla extract.
15025	15.60	0.03	0.14	-----	Positive ----	0.9941	Imitation vanilla extract; misbranded; sale illegal.
15026	14.46	0.40	0.86	0.24	Negative ----	1.0028	Vanilla extract.
15024	5.26	-----	0.16	-----	Positive ----	0.9903	Imitation vanilla extract; misbranded; sale illegal.
15028	17.74	0.24	0.29	0.31	0.06%	1.0282	Compound vanilla extract.
15039	13.25	0.35	0.73	0.29	Negative ----	0.9941	Vanilla extract.
14665	4.20	0.18	0.42	0.23	----do-----	1.0109	do.
14664	6.30	0.34	0.84	-----	----do-----	1.0244	do.

defines other products as wine vinegar, malt vinegar, sugar vinegar, glucose vinegar, and spirit vinegar, but it makes it clear that the word vinegar when used alone refers to a product made from the juice of apples.

The Board of Agriculture of North Carolina, in adopting food standards for the State under the Food Law, followed the United States Department and adopted the same standards and definitions for vinegar as are provided for in Food Inspection Decision No. 140 of the National Department. Under both the State and National Food Laws vinegar is a product of standard strength made from the juice of apples. Spirit vinegar, which is a four per cent solution of acetic acid in water, colored, is not vinegar, and cannot be legally sold as vinegar. It has the acid strength of vinegar, to be sure, but instead of having the delicious flavor and aroma so delightful in vinegar it has nothing but a pungent, stinging odor and sour taste.

The sale of compound vinegar, spirit vinegar, etc., is perfectly legal, provided these products are sold for what they are, and under their own names. If compound vinegar or spirit vinegar, etc., should be labeled "*vinegar*" and shipped from one State into another the National Food Law would be violated and the shipper subject to indictment. Manufacturers and jobbers know they can't label these products "*vinegar*" and ship them from one State into another. As these products cannot, because of the National Food Law, be shipped from one State into another as vinegar, this Department holds that retail dealers have no right to sell

them to their customers as vinegar, and that retail dealers must sell them for what they are, and not as vinegar.

Some vinegar manufacturers denounce the State Food Law and this Department, and preach to the retail dealers of the State that the Department has adopted a false and arbitrary standard for vinegar which is unreasonable. These manufacturers label their products compound and ship them into the State as compound, and then want the retail dealers to sell them to their customers as vinegar. The State standard

## RESULTS OF THE EXAMINATION OF VIN

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14382	-----	Vinegar	C. W. Antrim & Sons, Richmond, Va.	W. T. Buchanan, Sanford..
14868	Vinegar, Glenwood, Blended Distilled and Apple.	Vinegar, Blended	do	E. B. Liles, Rockingham..
14395	-----	Vinegar	do	J. A. Branch, Lumberton..
14794	Vinegar, Glenwood, Blended Distilled and Apple.	Vinegar, Compound.	do	C. Dunbar, High Point....
14774	do	do	do	Oppenheimers, Rocky Mount.
14562	do	do	do	Walter Credle Co., Washington.
14771	-----	Vinegar	-----	F. Y. Arrington, Rocky Mount.
14379	-----	Vinegar	Austin-Nichols & Co. New York.	The Home Store, Southern Pines.
14549	-----	do	do	A. Thomas, Beaufort.....
14532	-----	do	do	H. A. Powell Grocery Co., Goldsboro.
14405	-----	do	-----	Barden Bros., Wilmington
14368	Vinegar, Monogram.	do	-----	J. H. Bell, Wilson.....
14564	-----	do	-----	J. F. Bishop, Belhaven....
14853	-----	do	A. Blanton Grocery Co., Shelby, N. C.	Justice Dobbins Co., Rutherfordton.
14834	-----	Vinegar, Spirit	-----	E. S. Bowen, Canton.....
14855	-----	Vinegar	-----	Boyd Garner Co., Charlotte.
14819	-----	Vinegar, Spirit	-----	Brannon & Augley, Lenoir
14570	-----	Vinegar	-----	Branning Mfg. Co Store, Edenton.
14790	-----	do	-----	W. C. Brewer & Co., Wake Forest.
14571	-----	do	-----	W. R. Brothers, Edenton..
14831	Vinegar, Hyman's Old Kentucky Home.	do	-----	Bryson & Owenby, Asheville.

\*Cubic centimetre of N-10 HCl to neutralize 100 gm. sample.

for vinegar is the same as the National Standard. If the manufacturer can ship a product labeled vinegar then retail dealers can retail it as vinegar, but if the manufacturer cannot ship it labeled vinegar then the retail man cannot sell it as vinegar, and must sell it as compound vinegar, spirit vinegar, etc., as the case may be.

For results of the examination of samples made during the year see table below.

# EGAR AND SUBSTITUTES FOR VINEGAR.

Laboratory Number	Acidity, Total— Per Cent	Total Solids in Solution— Per Cent	Ash—Per Cent	Total Sugars— Per Cent	Non-sugar Solids—Per Cent	Alkalinity of Soluble Ash*	Remarks and Conclusions
14383	4.25	2.38	-----	-----	-----	-----	Vinegar.
14869	4.65	1.28	-----	-----	-----	-----	Compound vinegar; not blended, as labelled.
14395	4.68	2.72	-----	-----	-----	-----	Vinegar.
14794	4.90	1.44	-----	-----	-----	-----	Compound vinegar; not blended, as labelled.
14774	4.70	1.52	-----	-----	-----	-----	do.
14562	4.60	1.57	-----	-----	-----	-----	do.
14771	4.20	2.20	0.28	0.95	1.25	34.00	Compound vinegar, sold as vinegar; misbranded; sale was illegal.
14379	6.40	1.90	-----	-----	-----	-----	Vinegar.
14549	5.40	1.60	-----	-----	-----	-----	do.
14532	4.40	2.05	-----	-----	-----	-----	do.
14405	5.30	0.41	-----	-----	-----	-----	Spirit vinegar, sold as vinegar; misrepresented; sale illegal
14368	4.80	0.83	-----	-----	-----	-----	Compound vinegar, sold as vinegar; misrepresented; sale illegal.
14564	4.90	2.05	-----	-----	-----	-----	Vinegar.
14853	4.65	1.83	-----	-----	-----	-----	do.
14834	4.20	0.51	-----	-----	-----	-----	Spirit vinegar.
14855	5.90	2.44	-----	-----	-----	-----	Vinegar.
14819	4.55	0.35	-----	-----	-----	-----	Imitation or spirit vinegar.
14570	5.20	0.40	-----	-----	-----	-----	Spirit vinegar, sold as vinegar; misrepresented; sale illegal.
14790	4.75	0.70	-----	-----	-----	-----	Compound vinegar, sold as vinegar; misrepresented; sale illegal.
14571	5.85	0.60	-----	-----	-----	-----	Compound vinegar, adulterated; sold as vinegar; misrepresented; sale illegal.
14831	4.25	1.69	-----	-----	-----	-----	Vinegar.

## RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14416		Vinegar, Grain		E. W. Burnett, Wilmington
14397		Vinegar		R. L. Burton, Wilmington.
14569		do.		Bynum & Thompson, Edenton.
14519		do.		Byrd & Bell, Mount Olive.
14836		do.		Carland & McGuire Co., Canton.
14826		Vinegar, Artificial.	Sol Caslar, Asheville, N. C.	F. B. Munson, Asheville...
14830		Vinegar	do.	W. B. Church, Asheville...
14779		do.		E. Clark, Weldon
14983		do.		O. W. Clayton, Brevard...
14542		do.	L. A. Cobb Co., Kinston, N.C.	W. H. Murphy, Kinston...
14837	Vinegar, Superior Brand.	do.	Coca-Cola Bottling Co., Asheville, N. C.	W. M. Lawson, Hot Springs
14822	Apple and Acetic Acid Vinegar.	do.	Cola Bottling Co., Hickory, N. C.	Pearson Bros., Lenoir....
14864		do.		Cook & Harris, Concord...
14560		do.		A. J. Cox & Co., Washington.
14420		do.		J. B. Cox, Warsaw
14829		do.		W. A. Davis, Asheville....
14561	Vinegar, Distilled Imitation, Popular Brand.	Vinegar, Com-pound.	Dawson Bros. Mfg. Co., Memphis, Tenn.	W. Gray Willis, Washington
14818	Vinegar, Southern Beauty.	Vinegar	do.	Cloer's Market, Lenoir...
14524		do.	Deans & Moye, Goldsboro.	E. G. Outlaw, Goldsboro...
14786		do.	T. P. Deitrick, Richmond, Va.	Collins Bros., Franklinton.
14789		do.	do.	J. W. Mangum, Wake Forest.
14567		do.		Divers & Raper, Hertford.
14372		do.		Drake & Cobb, Wilson...
14793		do.		C. Dunbar, High Point...
14534		do.		E. L. Edmundson, Goldsboro.
14575		do.		Joseph Ellis, Elizabeth City.
14539	Vinegar, Spirit			A. M. Fields, LaGrange...
14865	Vinegar		Fleming-Christian Co., Richmond, Va.	Powers & Millar, Rocky Mount.
14839		do.	Lyner Frady, Waynesville, N.C.	E. P. Martin, Waynesville.
14865		do.		B. D. Funderburk, Matthews.
14847				Gaston Seed & Provision Co., Gastonia.
14825	Vinegar, Country			Gaston & Tate, Marion....
14781	Vinegar, Com-pound.		Jas. G. Gill Co., Norfolk, Va.	R. M. Purnell, Weldon....

\*Cubic centimeter N-10 to HCl to neutralize 100 gm. sample.

AND SUBSTITUTES FOR VINEGAR—*Continued.*

Laboratory Number	Acidity, Total— Per Cent	Total Solids in Solution— Per Cent	Ash—Per Cent	Total Sugars— Per Cent	Non-sugar Solids— Per Cent	Alkalinity of Soluble Ash*	Remarks and Conclusions
14416	5.25	0.33	-----	-----	-----	-----	Spirit vinegar sold as grain vinegar; should be sold as spirit vinegar.
14397	4.50	2.08	-----	-----	-----	-----	Vinegar.
14569	4.35	2.31	-----	-----	-----	-----	do.
14519	5.35	2.36	-----	-----	-----	-----	do.
14836	4.05	2.45	-----	-----	-----	-----	do
14826	5.25	0.04	-----	-----	-----	-----	Spirit vinegar or imitation vinegar.
14830	4.20	1.92	0.28	0.55	1.37	24.00	Vinegar.
14779	6.35	1.85	0.45	-----	-----	-----	do.
14983	1.15	1.95	-----	-----	-----	-----	A product changing from cider to vinegar.
14542	4.90	0.30	-----	-----	-----	-----	Spirit vinegar sold as vinegar; misrepresented; sale illegal.
14837	4.75	1.99	-----	-----	-----	-----	Vinegar.
14822	4.05	0.32	-----	-----	-----	-----	Spirit vinegar. misbranded; sale illegal.
14864	4.55	0.41	-----	-----	-----	-----	Spirit vinegar sold as vinegar; misrepresented; sale illegal.
14560	4.40	1.86	-----	-----	-----	-----	Vinegar.
14420	4.25	0.79	-----	-----	-----	-----	Compound vinegar sold as vinegar; misrepresented; sale illegal.
14829	4.75	0.24	-----	-----	-----	-----	Spirit vinegar sold as vinegar, misrepresented; sale illegal.
14561	4.00	0.27	-----	-----	-----	-----	Spirit vinegar and not distilled vinegar as branded.
14818	5.20	1.49	0.28	0.63	0.86	24.00	Vinegar, reduced to standard.
14524	4.25	0.75	-----	-----	-----	-----	Compound vinegar, sold by retail dealer as vinegar; misrepresented; sale illegal.
14786	4.65	0.47	-----	-----	-----	-----	Compound vinegar, sold by retail dealer as vinegar; misrepresented; sale illegal.
14789	4.70	0.64	-----	-----	-----	-----	do.
14567	6.05	0.53	-----	-----	-----	-----	do.
14372	4.30	2.22	-----	-----	-----	-----	Vinegar.
14793	4.50	2.23	0.34	0.77	1.46	32.00	Vinegar reduced to standard with water.
14534	5.35	0.37	-----	-----	-----	-----	Spirit vinegar sold by retail dealer as vinegar; misrepresented; sale illegal.
14575	4.10	0.93	-----	-----	-----	-----	Compound vinegar, retailed as vinegar; misrepresented; sale illegal.
14539	3.95	0.23	-----	-----	-----	-----	Spirit vinegar, slightly below standard.
14365	4.30	1.97	-----	-----	-----	-----	Vinegar.
14839	2.60	1.83	-----	-----	-----	-----	Vinegar below standard; adulterated; sale illegal.
14865	4.45	0.24	-----	-----	-----	-----	Spirit vinegar. sold as vinegar; misrepresented; sale illegal.
14847	4.20	1.93	0.29	0.76	1.17	30.00	Vinegar, adulterated; sale illegal.
14825	2.85	1.35	-----	-----	-----	-----	Vinegar, below standard; adulterated; sale illegal.
14781	4.75	0.48	-----	-----	-----	-----	Compound vinegar, adulterated and misbranded; sale illegal.

## RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14394		Vinegar	D. J. Gregory Vinegar Co., Richmond, Va.	R. D. Caldwell & Son, Lumberton.
14544		do.	do.	Henry French, Kinston
14410		do.	do.	J. R. Guthrie, Wilmington.
14367		do.	Geo. J. Hales Co., Rocky Mount, N. C.	G. C. Robbins, Rocky Mount.
14773		do.	do.	E. T. Joyner, Rocky Mount
14541		Vinegar, Compound.	do.	W. P. Hardy, LaGrange
14557		do.	Helwig, Leitch & Tuer, Baltimore, Md.	Willis Grocery Co., New Bern.
14772		Vinegar	H. J. Heinz, Pittsburg, Pa.	H. C. Joyner, Rocky Mount
14854		do.	W. I. Henderson Grocery Co., Charlotte, N. C.	J. E. Morris, Charlotte
14863		do.	do.	Piedmont Grocery Co., Charlotte.
14846		do.	Hendersonville Grocery Co., Hendersonville, N. C.	C. C. Younge, Brevard
14798		do.	High Point Grocery Co., High Point, N. C.	D. M. Ballance, High Point
14797		do.	do.	Z. M. Silman, High Point.
14545		Vinegar, Chemical.	do.	Hardy Hill, Kinston
14817		Vinegar	Hirsch Bros., Louisville, Ky.	H. T. Newland, Lenoir
14419		do.	do.	Hobbs & Russ, Warsaw
14520		do.	do.	Mrs. J. F. Hollingsworth, Mount Olive.
14414		do.	do.	Holmes Grocery Co., Wilmington.
14870		do.	R. M. Hughes & Co., Louisville, Ky.	J. E. Haywood, Rockingham.
14851	Vinegar, Monogram, Distilled and Apple.	Vinegar, Compound.	do.	The Shuford Co., Gastonia
14852		Vinegar, Distilled	do.	do.
14867		Vinegar	do.	J. H. Tice, Wadesboro
14868		do.	do.	W. N. Pinkston, Wadesboro.
14385		do.	do.	N. C. Phillips & Co., Maxton.
14392		do.	do.	L. H. Caldwell, Lumberton
14391		do.	do.	Lackey Bros., Hamlet
14780		do.	do.	W. T. Parker, Weldon
14776		do.	do.	O. D. Mann, Whitakers
14769		do.	do.	J. D. Williams, Wilson
14768		do.	do.	Carroll Grocery Co., Wilson
14518		do.	do.	W. R. Jennette, Mt. Olive
14380		do.	do.	Huntress Grocery Co., Southern Pines.
14849	Vinegar, Log Cabin.	do.	Interstate Fruit Produce Co., Baltimore, Md.	Harry Baber Co., Gastonia

\*Cubic centimeter N-10 HCl to neutralize 100 gm. sample.



AND SUBSTITUTES FOR VINEGAR—*Continued.*

Laboratory Number	Acidity, Total—Per Cent	Total Solids in Solution—Per Cent	Ash—Per Cent	Total Sugars—Per Cent	Non-sugar Solids—Per Cent	Alkalinity of Soluble Ash *	Remarks and Conclusions
14394	4.56	2.84	-----	-----	-----	-----	Vinegar.
14544	5.50	2.14	-----	-----	-----	-----	do.
14410	4.75	2.50	-----	-----	-----	-----	do.
14367	4.80	2.20	0.34	-----	-----	-----	do.
14773	4.10	2.47	-----	-----	-----	-----	do.
14541	4.20	1.39	-----	-----	-----	-----	Compound vinegar.
14557	4.00	0.29	-----	-----	-----	-----	do.
14772	5.15	1.27	-----	-----	-----	-----	Vinegar reduced to standard acidity.
14854	4.10	0.37	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14863	4.10	1.82	0.22	0.69	1.13	21.00	Compound vinegar; retailed as vinegar; misrepresented; sale illegal.
14846	5.65	2.28	-----	-----	-----	-----	Vinegar.
14798	4.90	1.84	-----	-----	-----	-----	do.
14797	4.95	2.09	-----	-----	-----	-----	Vinegar reduced to standard with water.
14545	4.40	0.42	-----	-----	-----	-----	Spirit vinegar.
14817	5.20	0.32	-----	-----	-----	-----	Spirit vinegar,retailed as vinegar;misrepresented;sale illegal
14419	5.50	0.47	-----	-----	-----	-----	do.
14520	4.30	2.05	-----	-----	-----	-----	Vinegar.
14414	4.20	2.11	-----	-----	-----	-----	do.
14870	3.55	1.63	0.27	0.83	0.80	26.00	Vinegar, below standard; adulterated; sale illegal.
14851	4.35	0.66	-----	-----	-----	-----	Compound Vinegar.
14852	5.75	0.18	-----	-----	-----	-----	Spirit vinegar and should be sold as spirit vinegar.
14867	3.65	1.83	-----	-----	-----	-----	Vinegar.
14868	4.20	0.36	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14385	4.40	1.30	-----	-----	-----	-----	Compound vinegar, retailed as vinegar; misrepresented; sale illegal.
14392	4.42	1.87	-----	-----	-----	-----	Vinegar.
14391	5.60	2.74	-----	-----	-----	-----	do.
14780	4.70	1.90	0.23	0.69	1.21	23.00	do.
14776	5.00	0.94	-----	-----	-----	-----	Compound vinegar, retailed as vinegar; misrepresented; sale illegal.
14769	4.85	1.54	-----	-----	-----	-----	Vinegar, reduced to standard acidity with water.
14768	4.25	1.82	0.35	0.56	1.26	32.00	do.
14518	4.60	1.69	0.29	-----	-----	32.00	Vinegar to which water had been added.
14380	4.80	2.05	0.29	-----	-----	30.00	Vinegar.
14849	4.85	2.27	-----	-----	-----	-----	do.

## RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14861		Vinegar		R. D. James, Charlotte...
14833		do.		E. C. Jarrett, Asheville...
14538		do.		H. H. Jenkins, Goldsboro.
14366		do.		E. T. Joyner, Rocky Mount
14363		do.		H. C. Joyner, Rocky Mount
14516		do.		W. D. Kelly, Clinton...
14418	Pin Money, Pure Apple Cider Vinegar.	do.	Mrs. E. G. Kidd, Inc., Richmond, Va.	Wilmington Grocery Co., Wilmington.
14804	Vinegar, Everybody's.		Knadler & Lucas, Louisville, Ky.	The Stone Co., Thomasville.
14777		Vinegar, Compound.		W. S. Knight, Whitakers...
14858		Vinegar, Grape.	T. G. Knotts, Suffolk, Va.	H. M. Parker, Charlotte...
14360		Vinegar		J. E. Williams, Greenville..
14396	Vinegar, Knott's Spirit and Grape	Vinegar, Grape.	T. G. Knott's, Suffolk, Va.	Bullock Bros., Lumberton.
14784		do.	do.	M. C. Pleasants, Louisburg
14778		Vinegar, Grape.	do.	J. S. Cutchin, Whitakers..
14556		do.	do.	H. C. Armstrong Grocery Co., New Bern.
14555	Vinegar, Distilled Pickling and Apple.	Vinegar, Compound.	do.	B. B. Davenport, New Bern.
14551		Vinegar, Grape.	do.	Hancock & Co., Beaufort.
14548		do.	do.	J. B. Morton, Morehead City.
14540		Vinegar, Apple.	do.	E. A. Walters, LaGrange..
14537		Vinegar, Compound.	do.	J. E. Crow, Goldsboro...
14535		Vinegar (Knotts)	do.	C. D. Taylor & Co., Goldsboro.
14531		Vinegar	do.	Henry Williams, Goldsboro
14522		Vinegar, Grape.	do.	W. D. Creech, Goldsboro..
14417		Vinegar (Knotts)	do.	Hall & Ross, Wilmington..
14411		do.	do.	W. L. Benson, Wilmington.
14408		Vinegar, Grape.	do.	P. L. Sellars, Wilmington..
14402		do.	do.	M. T. Madrin, Wilmington.
14404		Vinegar, Distilled	do.	H. W. Konig, Wilmington.
14401		Vinegar, Wine.	do.	Hanover Grocery Co., Wilmington.
14400		do.	do.	W. P. Woodcock, Wilmington.
14525		Vinegar		M. L. Lane, Goldsboro....

\*Cubic centimeter N-10 HCl to neutralize 100 gm. sample.

AND SUBSTITUTES FOR VINEGAR—*Continued.*

Laboratory Number	Acidity, Total— Per Cent	Total Solids in Solution— Per Cent	Ash—Per Cent	Total Sugars— Per Cent	Non-sugar Solids—Per Cent	Alkalinity of Soluble Ash,*	Remarks and Conclusions
14861	3.80	0.54	-----	-----	-----	-----	Spirit vinegar adulterated; below standard; retailed as vinegar; sale illegal.
14833	4.10	1.61	-----	-----	-----	-----	Vinegar.
14538	4.45	0.43	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14366	4.50	2.23	-----	-----	-----	-----	Vinegar
14363	4.10	1.62	-----	-----	-----	-----	do.
14516	4.25	2.22	-----	-----	-----	-----	do.
14418	4.65	2.18	-----	-----	-----	-----	do.
14804	4.10	0.24	-----	-----	-----	-----	Spirit vinegar; misbranded; sale illegal.
14777	5.55	1.03	-----	-----	-----	-----	Compound vinegar.
14858	5.95	0.50	-----	-----	-----	-----	Spirit vinegar with small amount of grape vinegar, retailed as grape vinegar; sale illegal.
14360	5.90	0.44	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14396	5.34	0.43	-----	-----	-----	-----	Compound vinegar, retailed as grape vinegar; misrepresented; sale illegal.
14784	5.80	0.60	-----	-----	-----	-----	do
14778	5.60	0.51	-----	-----	-----	-----	do.
14556	5.40	0.42	-----	-----	-----	-----	do.
14555	5.10	1.34	-----	-----	-----	-----	Compound vinegar and should be labeled compound vinegar.
14551	5.35	0.58	-----	-----	-----	-----	Compound vinegar, retailed as grape vinegar; misrepresented; sale illegal.
14548	5.70	0.45	-----	-----	-----	-----	do.
14540	4.80	2.44	-----	-----	-----	-----	Vinegar.
14537	5.45	0.44	-----	-----	-----	-----	Compound vinegar
14535	5.45	0.44	-----	-----	-----	-----	Compound vinegar, retailed as vinegar; misrepresented; sale illegal.
14531	5.35	0.38	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14522	5.15	0.42	-----	-----	-----	-----	Spirit vinegar, with possibly a little grape vinegar; retailed as grape vinegar; misrepresented; sale illegal.
14417	5.20	0.48	-----	-----	-----	-----	Compound vinegar retailed as vinegar; misrepresented; sale illegal.
14411	5.40	0.69	-----	-----	-----	-----	do.
14408	6.00	0.41	-----	-----	-----	-----	Compound vinegar, retailed as grape vinegar; misrepresented; sale illegal.
14402	6.20	0.57	-----	-----	-----	-----	do.
14404	4.30	0.23	-----	-----	-----	-----	Spirit vinegar, and not distilled.
14401	5.12	1.00	-----	-----	-----	-----	Compound vinegar, retailed as wine vinegar; misrepresented; sale illegal.
14400	5.32	0.69	-----	-----	-----	-----	do.
14525	4.00	2.58	-----	-----	-----	-----	Vinegar.

## RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14565		Vinegar.		Alex Lee, Belhaven.....
14820		do.	Francis H. Leggett & Co., New York, N. Y.	Harrison & Co., Lenoir....
14801		do.	Lexington Grocery Co., High Point, N. C.	J. W. Kennedy, High Point
14791		Vinegar, Compound.	do.	J. M. Hedrick, High Point.
14806		Vinegar.	do.	Tussey & Koontz, Lexington.
14362		do.	Libby, McNeil & Libby, Chicago, Ill.	F. Y. Arrington, Rocky Mount.
14359		do.		S. W. Lupton, Greenville..
14821		do.		McShane Mercantile Co., Lenoir.
14415		do.		May Bros., Wilmington....
14856	Vinegar, Pure Grape Salad, Cresca Pinard.	Vinegar, Grape.		Miller-VanNess Co., Charlotte.
14413		do.		Monarch Cash Grocery, Wilmington.
14388		Vinegar.		L. A. Monroe & Son, Laurinburg.
14409		do.		R. A. Montgomery, Wilmington.
14815		do.	Morganton Grocery Co., Morganton, N. C.	Hickory Cash Store, Hickory.
14823		do.	do.	H. L. Whitley, Morganton.
14803		do.		J. A. Morris & Bro., Thomasville.
14813		do.	J. K. Morrison & Son, Statesville, N. C.	D. J. Kimball, Statesville.
14576		Vinegar, Spirit.		Morrisette Bros., Elizabeth City.
14577		Vinegar.		Morrisette & Perry, Elizabeth City.
14809		Vinegar, Imitation.		Nassar Bros., Salisbury....
14828	Vinegar, White House.	Vinegar.	National Fruit Produce Co., Alexandria, Va.	Slayden-Fakes & Co., Asheville.
14307	do.	do.	do.	Stradley & Luther, Asheville.
14814	do.	do.	do.	C. D. Dunn & Co., Newton
14824		do.		P. F. Newton & Co., Morganton.
14381		do.		Nisbet & Womble, Sanford
14407		do.		C. R. Pope, Wilmington...
14845		do.	Pepsi-Cola Bottling Co., Asheville, N. C.	Peoples Grocery, Hendersonville.

\*Cubic centimeter N-10 HCl to neutralize 100 gm. sample.

AND SUBSTITUTES FOR VINEGAR—*Continued.*

Laboratory Number	Acid- ity, Total— Per Cent	Total Solids in Solution— Per Cent	Ash—Per Cent	Total Sugars— Per Cent	Non-sugar Solids—Per Cent	Alkalinity of Soluble Ash*	Remarks and Conclusions
14565	3.75	0.49	-----	-----	-----	-----	Spirit vinegar, below standard; sold as vinegar; adulterated and misrepresented; sale illegal.
14820	4.20	1.95	0.30	0.77	1.18	30.00	Vinegar.
14801	4.05	1.69	-----	-----	-----	-----	do.
14791	3.80	0.45	-----	-----	-----	-----	Compound vinegar, slightly below standard in acidity.
14806	4.15	2.01	-----	-----	-----	-----	Vinegar.
14362	5.50	2.38	-----	-----	-----	-----	do.
14359	5.30	2.09	0.26	-----	-----	-----	do.
14821	4.40	2.19	-----	-----	-----	-----	do.
14415	4.30	0.15	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14856	6.75	1.30	-----	-----	-----	-----	Grape vinegar.
14413	5.10	0.57	-----	-----	-----	-----	Compound vinegar, retailed as vinegar; misrepresented; sale illegal.
14388	4.45	2.06	0.28	-----	-----	30.00	Vinegar.
14409	4.05	1.75	-----	-----	-----	-----	do.
14815	4.35	0.41	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14823	3.80	0.61	-----	-----	-----	-----	Compound vinegar, retailed as vinegar; misrepresented; sale illegal.
14803	4.80	1.96	-----	-----	-----	-----	Vinegar.
14813	5.40	2.92	0.39	1.13	1.79	35.00	do.
14576	5.30	0.24	-----	-----	-----	-----	Spirit vinegar.
14577	3.70	2.13	-----	-----	-----	-----	Vinegar, slightly below standard.
14809	4.05	0.61	-----	-----	-----	-----	Spirit vinegar.
14828	4.45	2.24	0.29	1.02	1.22	32.00	Vinegar.
14307	4.10	2.02	-----	-----	-----	-----	do.
14814	4.85	2.28	-----	-----	-----	-----	do.
14824	4.60	2.18	0.32	0.86	1.32	31.00	do.
14381	4.35	2.55	0.29	-----	-----	34.00	do.
14407	3.70	0.59	-----	-----	-----	-----	Spirit vinegar, below standard; retailed as vinegar; adulterated and misrepresented; sale illegal.
14845	4.25	2.03	0.31	0.71	1.32	32.00	Vinegar, reduced to standard acidity.

## RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14795		Vinegar		J. E. Perryman, High Point.
14526		do	R. E. Pipkin, Goldsboro, N. C.	J. G. Hinson, Goldsboro..
14521		do	do	W. H. Tillman, Mt. Olive..
14515		do	do	Register Bros., Clinton...
14390		do	do	Rice & Folsom, Hamlet...
14356		do	Richmond Vinegar Works, Richmond, Va.	O. O. Boykin, Tarboro...
14782	Vinegar, Gold Medal.	do	do	Evans Bros., Henderson..
14775	Vinegar, Pride	do	do	H. Assad, Enfield.....
14770	Vinegar, Pure Apple Cider.	Vinegar	do	Wilson Wholesale Co., Wilson, N. C.
14370		do	do	J. W. Riley, Wilson.....
14808		do	Roberson Grocery Co., Salisbury, N. C.	C. P. Shuping, Salisbury..
14835		do	Rogers Grocery Co., Asheville, N. C.	J. M. Curtis & Son, Canton
14517		do	do	F. W. Royal, Clinton.....
14371		do	do	Ruffin-High Co., Wilson...
14386		do	do	Russell-Gillies Co., Laurinburg.
14810		Vinegar, Chemical.	do	Russell & Hilton, Salisbury
14384		Vinegar	E. A. Saunders Sons Co., Richmond, Va.	Pace Grocery Co., Maxton..
14382		do	do	Lee Store Co., Sanford....
14827		do	do	Clarence Sawyer, Asheville
14361		Vinegar, Distilled	do	S. M. Schultz, Greenville..
14559		Vinegar	do	Scott & Bergerson, Washington.
14399	Vinegar, Monogram Brand.	do	do	S. E. Sellars, Wilmington..
14816		do	do	Shell-Mitchell Grocery Co., Hickory.
14527		Vinegar, Distilled	E. S. Shelby Vinegar Co., Richmond, Va.	B. F. Carr, Goldsboro.....
14543		Vinegar	S. C. Sitterson, Kinston, N. C.	F. D. Tilley, Kinston.....
14841		do	Slayden-Fakes & Co., Bryson City, N. C.	Willhide & Thomas, Bryson City.
14842		do	do	A. J. Franklin, Bryson City.
14378	Vinegar, Golden Rod.	do	do	J. L. Smith & Son, Southern Pines.
14802		do	Smitherman Co., Greensboro, N. C.	A. A. Fouts, Thomasville..
14807	Vinegar, White Wine, Pickling.	Vinegar, Pickling	Sprague-Warner & Co., Chicago, Ill.	N. P. Murphy, Salisbury..
14536		Vinegar	do	Spence & Vinson, Goldsboro.
14796		do	T. S. Southgate & Son, Norfolk, Va.	I. A. Morris & Bro., High Point.
14550		do	do	M. R. Springle, Beaufort..

\*Cubic centimeter N-10 HCl to neutralize 100 gm. sample.

AND SUBSTITUTES FOR VINEGAR—*Continued.*

Laboratory Number	Acidity, Total— Per Cent	Total Solids in Solution— Per Cent	Ash—Per Cent	Total Sugars— Per Cent	Non-sugar Solids—Per Cent	Alkalinity of Soluble Ash*	Remarks and Conclusions
14795	4.80	2.00	0.33	0.67	1.43	34.00	Vinegar, reduced to standard acidity with water.
14526	4.45	1.98	-----	-----	-----	-----	Vinegar
14521	4.25	2.06	-----	-----	-----	-----	do.
14515	4.25	1.60	0.29	-----	-----	28.00	Vinegar, reduced to standard acidity with water.
14390	5.00	1.76	-----	-----	-----	-----	Vinegar.
14356	3.20	0.65	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14782	4.15	2.97	-----	-----	-----	-----	Vinegar.
14775	4.05	0.38	-----	-----	-----	-----	Spirit vinegar; misbranded; sale illegal.
14770	4.30	1.81	-----	-----	-----	-----	Vinegar
14370	4.20	2.25	-----	-----	-----	-----	do.
14808	3.20	0.31	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14835	4.90	1.71	0.29	0.56	1.15	26.00	Vinegar, reduced to standard acidity with water.
14517	4.45	2.42	-----	-----	-----	-----	Vinegar.
14371	4.40	2.26	-----	-----	-----	-----	do.
14386	5.20	0.53	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14810	4.00	0.74	-----	-----	-----	-----	Compound vinegar.
14384	4.60	2.05	0.29	-----	-----	31.00	Vinegar.
14382	4.50	2.25	-----	-----	-----	-----	do.
14827	4.65	2.22	-----	-----	-----	-----	do.
14361	4.30	0.24	-----	-----	-----	-----	Spirit vinegar and not distilled vinegar as labeled.
14559	4.75	2.70	-----	-----	-----	-----	Vinegar.
14399	4.52	1.63	-----	-----	-----	-----	do.
14816	4.65	0.59	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14527	4.15	0.68	-----	-----	-----	-----	Spirit vinegar and not distilled vinegar as labeled.
14543	4.10	1.90	-----	-----	-----	-----	Vinegar.
14841	4.15	2.65	-----	-----	-----	-----	do.
14842	4.20	1.99	-----	-----	-----	-----	do.
14378	4.45	1.88	-----	-----	-----	-----	do.
14802	3.95	0.29	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14807	4.35	0.27	-----	-----	-----	-----	Spirit vinegar, misbranded; it is not wine vinegar; sale illegal.
14536	4.35	1.39	0.23	-----	-----	23.00	Vinegar, reduced to standard acidity.
14796	4.15	0.54	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14550	6.60	0.63	-----	-----	-----	-----	do.

## RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14799		Vinegar, Chemical.		T. J. Steed, High Point...
14814		Vinegar	George Stiles, Murphy, N. C.	A. G. Deweese, Murphy....
14832		do		Stradley & Luther, Asheville.
14547		do		Stroud Bros., Kinston.....
14785		do	Suffolk Vinegar Works, Suffolk, Va.	Ballard-Cheatham Co., Franklinton, N. C.
14563		do		A. T. Summerlin, Washington.
14533		do		W. L. Summerlin, Goldsboro.
14558		Vinegar, Compound.		W. M. Swanner, Washington.
14838		Vinegar	Swift & Co., Asheville, N. C.	Miller Bros., Waynesville..
14857		do	Swift & Co., Charlotte, N. C.	J. C. Purcell, Charlotte....
14364		do		C. D. Tharrington, Rocky Mount.
14862		do	Thomas Grocery Co., Charlotte, N. C.	W. B. Estridge, N. Charlotte.
15076		Vinegar, Spirit		Thomas-Howard Co., Greensboro.
14530		Vinegar	Thornton & Banks, Goldsboro, N. C.	John H. Hogan, Goldsboro
14528		do	do	J. B. Strickland, Goldsboro.
14398		do		D. F. Toler, Wilmington...
14792		do		J. R. Turner, High Point..
14389		do		C. B. Tyson, Laurinburg..
14787		do		Wake Mercantile Co., Wake Forest.
14840		do		Waynesville Grocery Co., Waynesville.
14859		Vinegar, Imitation.		Weddington & Harmon, Charlotte.
14546		Vinegar	West & Clayton, Kinston, N.C.	Fred. R. Munn, Kinston...
14566		do		C. W. White, Hertford.....
14393		do	White & Gough, Lumberton, N. C.	White & Gough, Lumberton.
14369		do		J. D. Williams, Wilson....
14848		do	R. C. Williams & Co., New York, N. Y.	Elite Grocery, Gastonia....
14553	Vinegar, Crescent Brand.	do	do	J. H. Potter, Jr., Beaufort.
14788		do	Williams Bros., Co. Detroit, Mich.	Wake Forest Supply Co., Wake Forest.
14783	Vinegar, Williams	do	do	E. D. Harton, Henderson..
14552	do	do	do	C. A. Clawson, Beaufort..
14554		do		S. W. Willis, New Bern....

\*Cubic centimeter N-10 HCl to neutralize 100 gm. sample.



AND SUBSTITUTES FOR VINEGAR—*Continued.*

Laboratory Number	Acidity, Total—Per Cent	Total Solids in Solution—Per Cent	Ash—Per Cent	Total Sugars—Per Cent	Non-sugar Solids—Per Cent	Alkalinity of Soluble Ash	Remarks and Conclusions
14799	4.35	0.30	-----	-----	-----	-----	Spirit vinegar.
14844	1.25	1.29	-----	-----	-----	-----	A product retailed as vinegar; not vinegar; misrepresented; sale illegal.
14832	4.75	2.50	-----	-----	-----	-----	Vinegar
14547	4.30	2.09	-----	-----	-----	-----	do.
14785	5.15	0.45	-----	-----	-----	-----	Spirit vinegar, sold as vinegar; misrepresented; sale illegal.
14563	5.35	0.45	-----	-----	-----	-----	Compound vinegar, retailed as vinegar; misrepresented; sale illegal.
14533	4.60	1.81	-----	-----	-----	-----	Vinegar.
14558	9.35	0.34	-----	-----	-----	-----	Acetic acid and water, retailed as vinegar; misrepresented; sale illegal.
14838	4.70	2.75	0.41	0.77	1.98	39.00	Vinegar.
14857	4.00	2.49	-----	-----	-----	-----	do.
14364	4.20	1.64	-----	-----	-----	-----	do.
14862	3.85	0.36	-----	-----	-----	-----	Spirit vinegar below, standard; retailed as vinegar; misrepresented; sale illegal.
15076	6.75	-----	-----	-----	-----	-----	Spirit vinegar.
14530	3.70	3.38	-----	-----	-----	-----	Vinegar, below standard in acidity; adulterated; sale illegal.
14528	3.65	3.26	-----	-----	-----	-----	do.
14398	4.18	2.28	0.32	-----	-----	31.00	Vinegar.
14792	5.90	0.35	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14389	4.60	0.47	-----	-----	-----	-----	do.
14787	5.60	0.38	-----	-----	-----	-----	do.
14840	4.25	1.69	-----	-----	-----	-----	Vinegar.
14859	4.55	0.29	-----	-----	-----	-----	Spirit vinegar.
14546	4.00	0.28	-----	-----	-----	-----	Spirit vinegar, retailed as apple vinegar; misrepresented sale illegal.
14566	4.90	2.60	-----	-----	-----	-----	Vinegar.
14393	4.00	0.26	-----	-----	-----	-----	Spirit vinegar; misbranded; sale illegal.
14369	4.30	1.89	-----	-----	-----	-----	Vinegar.
14848	4.75	2.14	-----	-----	-----	-----	do.
14553	4.15	1.85	-----	-----	-----	-----	do.
14788	4.25	2.30	-----	-----	-----	-----	do.
14783	4.65	2.04	-----	-----	-----	-----	do.
14552	4.45	1.69	-----	-----	-----	-----	do.
14554	5.50	0.58	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.

## RESULTS OF THE EXAMINATION OF VINEGAR

Laboratory Number	Material and Brand from Label	Sold by Dealer as—	Manufacturer or Wholesaler	Retail Dealer or Party Who Sent Sample for Analysis
14373	Vinegar, White House.	Vinegar.....		Otis Winborne, Wilson.....
14843	.....	.....do.....	Wofford-Fain, Murphy, N. C.	G. E. Lail & Co., Whitakers
14573	.....	.....do.....	W. J. Woodley, Elizabeth City, N. C.	S. S. Davis, Elizabeth City.
14354	.....	.....do.....		York-Perkins & Co., Greenville.

\*Cubic centimeter N-10 HCl to neutralize 100 gm. sample.

AND SUBSTITUTES FOR VINEGAR—*Continued.*

Laboratory Number	Acidity, Total— Per Cent	Total Solids in Solution— Per Cent	Ash—Per Cent	Total Sugars— Per Cent	Non-sugar Solids—Per Cent	Alkalinity of Soluble Ash*	Remarks and Conclusions
14373	4.10	1.58	-----	-----	-----	-----	Vinegar reduced, to standard acidity.
14843	4.35	0.29	-----	-----	-----	-----	Spirit vinegar, retailed as vinegar; misrepresented; sale illegal.
14573	4.65	2.06	0.28	-----	-----	27.00	Vinegar.
14358	4.40	2.05	0.26	-----	-----	-----	Vinegar.



# INDEX

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	PAGE
Beers, Imitation and Near Beers.....	8
Butter and Butter Substitutes .....	8
Cheese .....	12
Cider and Imitation Ciders.....	12
Cinnamon Extract .....	14
Coffee and Coffee Substitutes .....	16
Enforcement of the Law .....	5
Flour .....	20
Honey .....	50
Ice Cream and Ice Cream Substitutes .....	52
Lard and Compound Lard .....	58
Lemon Extracts and Lemon Extract Substitutes.....	60
Local Dealers, Notice to.....	5
Maple Sirup Substitutes .....	64
Milk and Cream .....	64
Miscellaneous Samples .....	66
Molasses and Sirups .....	66
Net Weight or Measure .....	5
Olive and Other Table and Cooking Oils.....	80
Orange Extracts and Orange Extract Substitutes.....	82
Peppermint Extracts .....	84
Rice .....	84
Standards and Regulations, Notes on.....	6
Sweet Oil .....	86
Vanilla Extracts and Vanilla Extract Substitutes.....	88
Vinegar and Vinegar Substitutes.....	92
Work for the Year.....	7

## LEAF TOBACCO REPORT FOR OCTOBER, 1915.

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Pounds sold for producers.....	57,608,799
Pounds sold for dealers.....	2,170,519
Pounds sold for warehouses.....	4,372,682
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Total .....	64,152,000











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